

=> FILE REG

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STRUCTURE FILE UPDATES: 7 MAR 2007 HIGHEST RN 925547-09-7  
DICTIONARY FILE UPDATES: 7 MAR 2007 HIGHEST RN 925547-09-7

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=> FILE HCAPLU

FILE 'HCAPLUS' ENTERED AT 15:21:20 ON 08 MAR 2007  
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FILE COVERS 1907 - 8 Mar 2007 VOL 146 ISS 11  
FILE LAST UPDATED: 7 Mar 2007 (20070307/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate  
substance identification.

=> D QUE

L2 44 SEA FILE=REGISTRY ABB=ON (7439-93-2/BI OR 10022-31-8/BI OR  
108-03-2/BI OR 109-87-5/BI OR 109-99-9/BI OR 110-71-4/BI OR  
111-96-6/BI OR 111109-77-4/BI OR 112-49-2/BI OR 123-91-1/BI OR  
126-33-0/BI OR 1321-12-6/BI OR 13446-48-5/BI OR 13454-83-6/BI  
OR 13568-33-7/BI OR 142-68-7/BI OR 143-24-8/BI OR 143314-14-1/B  
I OR 149-73-5/BI OR 17081-21-9/BI OR 25154-54-5/BI OR 25321-14-  
6/BI OR 25322-01-4/BI OR 2564-83-2/BI OR 33454-82-9/BI OR  
505-22-6/BI OR 506-93-4/BI OR 556-65-0/BI OR 56778-64-4/BI OR

610-39-9/BI OR 646-06-0/BI OR 6484-52-2/BI OR 73506-93-1/BI OR  
75-52-5/BI OR 77-79-2/BI OR 7704-34-9/BI OR 7757-79-1/BI OR  
7758-09-0/BI OR 7789-18-6/BI OR 7790-69-4/BI OR 872-93-5/BI OR  
90076-65-6/BI OR 96-47-9/BI OR 98-95-3/BI)

L3 9 SEA FILE=REGISTRY ABB=ON L2 AND NITRO  
L4 4 SEA FILE=REGISTRY ABB=ON L2 AND NITRITE  
L5 7 SEA FILE=REGISTRY ABB=ON L2 AND NITRATE  
L6 20 SEA FILE=REGISTRY ABB=ON (L3 OR L4 OR L5)  
L7 24 SEA FILE=REGISTRY ABB=ON L2 NOT L6  
L8 8 SEA FILE=REGISTRY ABB=ON L7 AND ETHER  
L9 2 SEA FILE=REGISTRY ABB=ON L7 AND FURAN  
L10 0 SEA FILE=REGISTRY ABB=ON L7 AND TRIOXANE  
L11 1 SEA FILE=REGISTRY ABB=ON L7 AND PYRAN  
L12 2 SEA FILE=REGISTRY ABB=ON L7 AND DIOXO?  
L13 2 SEA FILE=REGISTRY ABB=ON L7 AND DIOXANE  
L14 1 SEA FILE=REGISTRY ABB=ON TRIOXANE/CN  
L15 15 SEA FILE=REGISTRY ABB=ON (L8 OR L9 OR L10 OR L11 OR L12 OR  
L13 OR L14)  
L16 4 SEA FILE=REGISTRY ABB=ON L7 AND SULFONE  
L17 3 SEA FILE=REGISTRY ABB=ON L16 NOT LI/ELS  
L19 3 SEA FILE=REGISTRY ABB=ON L7 AND SULFOL?  
L20 17 SEA FILE=REGISTRY ABB=ON L15 OR L17 OR L19  
L21 8 SEA FILE=REGISTRY ABB=ON L7 NOT L20  
L22 1 SEA FILE=REGISTRY ABB=ON L21 AND (DIMETHOXY OR DIETHOXY)  
L23 1 SEA FILE=REGISTRY ABB=ON L21 AND TRIMETHOXY  
L25 1 SEA FILE=REGISTRY ABB=ON L21 AND PIPERI?  
L26 19 SEA FILE=REGISTRY ABB=ON L20 OR L22 OR L23  
L27 21 SEA FILE=REGISTRY ABB=ON L6 OR L25  
L29 281582 SEA FILE=REGISTRY ABB=ON POLYETHER/PCT  
L30 45585 SEA FILE=REGISTRY ABB=ON L29 NOT 1-300/NR  
L31 25025 SEA FILE=REGISTRY ABB=ON L30 NOT (ATE OR ACID)  
L32 23306 SEA FILE=REGISTRY ABB=ON L31 NOT CARBONYL  
L34 7394 SEA FILE=REGISTRY ABB=ON L32 NOT (N OR S OR SI OR P OR F OR  
CL OR I OR BR)/ELS  
L35 4561 SEA FILE=REGISTRY ABB=ON L34 NOT OXO  
L36 4248 SEA FILE=REGISTRY ABB=ON L35 NOT AL  
L37 1 SEA FILE=REGISTRY ABB=ON SULFUR/CN  
L38 1 SEA FILE=REGISTRY ABB=ON LITHIUM/CN  
L39 5 SEA FILE=REGISTRY ABB=ON L21 NOT (L22 OR L23 OR L25)  
L40 3 SEA FILE=REGISTRY ABB=ON L39 NOT (L37 OR L38)  
L45 1551238 SEA FILE=HCAPLUS ABB=ON L26 OR ?ETHER?  
L53 2925 SEA FILE=HCAPLUS ABB=ON (CATHODE? OR POS?(2A)ELECTRODE?) (4A) (S  
OR SULFUR? OR L37)  
L56 15508 SEA FILE=HCAPLUS ABB=ON (ANODE# OR NEG?(2A)ELECTRODE?) (4A) (LI  
OR LITHIUM? OR L38)  
L63 12 SEA FILE=HCAPLUS ABB=ON L53 AND L56 AND (?NITRO? OR ?NITRATE?  
OR ?NITRITE? OR L27)  
L64 6 SEA FILE=HCAPLUS ABB=ON L63 AND L45  
L65 5 SEA FILE=HCAPLUS ABB=ON L63 AND (POLYETHER? OR L36)  
L66 7 SEA FILE=HCAPLUS ABB=ON L64 OR L65  
L68 4954 SEA FILE=HCAPLUS ABB=ON L40  
L69 3105 SEA FILE=HCAPLUS ABB=ON (LI OR LITHIUM) (A) (S OR SULFUR) OR  
LIS OR SLI  
L70 7979 SEA FILE=HCAPLUS ABB=ON (L68 OR L69)  
L71 562 SEA FILE=HCAPLUS ABB=ON L70 AND (?NITRO? OR ?NITRATE? OR  
?NITRITE? OR L27)  
L72 179 SEA FILE=HCAPLUS ABB=ON L71 AND L45  
L73 87 SEA FILE=HCAPLUS ABB=ON L71 AND (POLYETHER? OR L36)  
L74 210 SEA FILE=HCAPLUS ABB=ON L72 OR L73  
L76 110 SEA FILE=HCAPLUS ABB=ON L74 AND (BATTER? OR CELL#)

L77 96 SEA FILE=HCAPLUS ABB=ON L76 AND ELECTROCHEMICAL/SC,SX  
 L78 80 SEA FILE=HCAPLUS ABB=ON L77 AND ELECTROLYTE?  
 L79 17 SEA FILE=HCAPLUS ABB=ON L69 AND L78  
 L80 3 SEA FILE=HCAPLUS ABB=ON L78 AND ("N-O" OR N(W)O)  
 L81 20 SEA FILE=HCAPLUS ABB=ON L66 OR L79 OR L80  
 L82 3 SEA FILE=HCAPLUS ABB=ON L77 AND ("N-O" OR N(W)O)  
 L83 20 SEA FILE=HCAPLUS ABB=ON L81 OR L82

=> D L83 BIB ABS IND HITSTR

L83 ANSWER 1 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:889143 HCAPLUS

DN 146:30021

TI Electrolytic liquid comprising organic solvent and lithium salt, and lithium-sulfur battery comprising the same

IN Han, Ji Seong; Kim, Jan Dee; Kim, Seok

PA Samsung Sdi Co., Ltd., S. Korea

SO Repub. Korean Kongkae Taeho Kongbo, No pp. given

CODEN: KRXXA7

DT Patent

LA Korean

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	KR 2005038897	A	20050429	KR 2003-74210	20031023
PRAI	KR 2003-74210		20031023		

AB An electrolytic liquid for a lithium-sulfur battery is provided to improve a solubility and an ionic stability of a sulfide ion, and thus to increase a discharge capacity of the lithium-sulfur battery, and a lithium-sulfur battery comprising the same. The electrolytic liquid comprises an organic solvent comprising an ether-based solvent, a cyclic ether-based solvent, and a nitrogen-containing cyclic solvent, and a lithium salt. The lithium-sulfur battery comprises such electrolytic liquid, together with a pos. electrode containing at least one pos. electrode active material selected from the group consisting of a sulfur element, a sulfur-based compound and a mixture thereof, and a neg. electrode containing a neg. electrode active material selected from the group consisting of a material capable of intercalating/deintercalating a lithium ion reversibly, a material capable of reacting with a lithium ion to form a lithium-containing compound reversibly, a lithium metal and a lithium alloy.

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium sulfur battery electrolyte

IT Battery electrolytes

Secondary batteries

(electrolyte for lithium sulfur battery)

=> D L83 BIB ABS IND HITSTR 2-20

L83 ANSWER 2 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:544098 HCAPLUS

DN 145:30918

TI Electrolyte for lithium-sulfur batteries

IN Kolosnitsyn, Vladimir; Karaseva, Elena  
 PA Oxis Energy Ltd., UK  
 SO PCT Int. Appl., 24 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2006059085	A1	20060608	WO 2005-GB4572	20051129
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	GB 2420907	A	20060607	GB 2005-4290	20050302
	GB 2420907	B	20060913		
PRAI	RU 2004-135236	A	20041202		
	GB 2005-4290	A	20050302		
	US 2005-657436P	P	20050302		
AB	<b>An electrolyte for a lithium-sulfur battery, the electrolyte comprising a solution of at least one electrolyte salt in at least two aprotic solvents. The components of the solution are selected so that the solution is eutectic or close to eutectic. Also disclosed is a lithium-sulfur battery including such an electrolyte. By using a eutectic mixture, the performance of the electrolyte and the battery at low temps. is much improved.</b>				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)				
ST	<b>electrolyte lithium sulfur battery</b>				
IT	<b>Battery electrolytes</b> (electrolyte for lithium-sulfur batteries)				
IT	Sulfones RL: DEV (Device component use); USES (Uses) (electrolyte for lithium-sulfur batteries)				
IT	Amines, uses RL: MOA (Modifier or additive use); USES (Uses) (electrolyte for lithium-sulfur batteries)				
IT	Secondary batteries (lithium; electrolyte for lithium-sulfur batteries)				
IT	Lithium alloy, base RL: TEM (Technical or engineered material use); USES (Uses) (electrolyte for lithium-sulfur batteries)				
IT	79-20-9, Methyl acetate 96-47-9, 2-Methyltetrahydrofuran 96-48-0, $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-60-4, Propyl acetate 109-99-9, Thf, uses				

110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane  
 141-78-6, Ethyl acetate, uses 143-24-8, Tetraglyme 554-12-1,  
 Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl  
 carbonate 646-06-0, 1,3-Dioxolane 917-73-7 1003-78-7,  
 2,4-Dimethylsulfolane 1977-37-3, Methylpropylsulfone 7439-93-2,  
 Lithium, uses 7560-59-0, Methylbutylsulfone 7791-03-9, Lithium  
 perchlorate 12136-58-2, Lithium sulfide 21324-40-3, Lithium  
 hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 56525-42-9,  
 Methyl propyl carbonate, uses 90076-65-6

RL: DEV (Device component use); USES (Uses)

(electrolyte for lithium-sulfur  
batteries)

IT 7446-09-5, Sulfur dioxide, uses 7553-56-2, Iodine, uses 7704-34-9,  
 Sulfur, uses 7726-95-6, Bromine, uses 7782-50-5, Chlorine, uses  
 10024-97-2, Nitrous oxide, uses 74432-42-1, Lithium  
 polysulfide

RL: MOA (Modifier or additive use); USES (Uses)

(electrolyte for lithium-sulfur  
batteries)

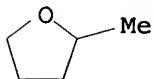
IT 96-47-9, 2-Methyltetrahydrofuran 109-99-9, Thf, uses  
 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane  
 143-24-8, Tetraglyme 646-06-0, 1,3-Dioxolane  
 90076-65-6

RL: DEV (Device component use); USES (Uses)

(electrolyte for lithium-sulfur  
batteries)

RN 96-47-9 HCAPLUS

CN Furan, tetrahydro-2-methyl- (CA INDEX NAME)



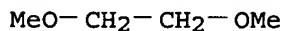
RN 109-99-9 HCAPLUS

CN Furan, tetrahydro- (CA INDEX NAME)



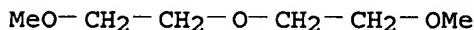
RN 110-71-4 HCAPLUS

CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



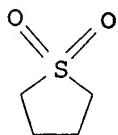
RN 111-96-6 HCAPLUS

CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)

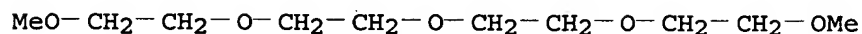


RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (CA INDEX NAME)



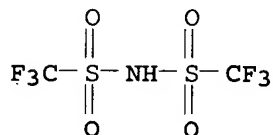
RN 143-24-8 HCAPLUS  
 CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)



RN 646-06-0 HCAPLUS  
 CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L83 ANSWER 3 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:529227 HCAPLUS

DN 145:11315

TI **Electrolyte for lithium-sulfur  
 batteries and lithium sulfur batteries  
 using the same**

IN Kolosnitsyn, Vladimir; Karaseva, Elena

PA Oxis Energy Limited, UK; Intellikraft Limited

SO Brit. UK Pat. Appl., 23 pp.

CODEN: BAXXDU

DT Patent

LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	GB 2420907	A	20060607	GB 2005-4290	20050302

GB 2420907 B 20060913  
 WO 2006059085 A1 20060608 WO 2005-GB4572 20051129

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

US 2006121355 A1 20060608 US 2005-290825 20051201  
 PRAI RU 2004-135236 A 20041202  
 GB 2005-4290 A 20050302  
 US 2005-657436P P 20050302

AB An electrolyte for a lithium-sulfur battery comprises a solution of  $\geq 1$  electrolyte salt in  $\geq 2$  aprotic solvents. The components of the solution are selected so that the solution is eutectic or close to eutectic. Also disclosed is a lithium-sulfur battery including such an electrolyte. By using a eutectic mixture, the performance of the electrolyte and the battery at low temps. is much improved.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 49

ST lithium sulfur battery electrolyte

IT Battery electrolytes  
 Eutectics  
 (lithium sulfur battery electrolytes)

IT Amines, uses  
 Carbon black, uses  
 Polyoxyalkylenes, uses  
 Sulfones  
 RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)  
 (lithium sulfur battery electrolytes)

IT Lithium alloy, base  
 RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)  
 (lithium sulfur battery electrolytes)

IT 79-20-9, Methylacetate 96-47-9, 2-Methyltetrahydrofuran 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethylpropionate 105-58-8, Diethylcarbonate 108-32-7, Propylene carbonate 109-60-4, Propylacetate 109-99-9, THF, uses 110-71-4 111-96-6, Diglyme 124-38-9, Carbon dioxide, uses 126-33-0, Sulfolane 141-78-6, Ethylacetate, uses 143-24-8, Tetraglyme 554-12-1, Methylpropionate 616-38-6, Dimethylcarbonate 623-53-0, Ethylmethylcarbonate 646-06-0, 1,3-Dioxolane 1003-78-7, 2,4-Dimethylsulfolane 1977-37-3, Methylpropylsulfone 7439-93-2D, Lithium, derivs. 7446-09-5, Sulfur dioxide, uses 7560-59-0, Methylbutylsulfone 7704-34-9D, Sulfur, derivs./polymers 7782-50-5, Chlorine, uses 7791-03-9, Lithium perchlorate 10024-97-2, Dinitrogen oxide, uses 18496-25-8,

Sulfide 20461-54-5, Iodide, uses 21324-40-3, Lithium hexafluorophosphate 24959-67-9, Bromide, uses 25322-68-3, Polyethylene oxide 29935-35-1, Lithium hexafluoroarsenate 31124-38-6, Ethylbutylsulfone 33454-82-9, Lithium trifluoromethane sulfonate 39448-96-9 56525-42-9, Methylpropylcarbonate, uses 74432-42-1, Lithium sulfide (Li<sub>2</sub>(Sx)) 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide  
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(lithium sulfur battery electrolytes)

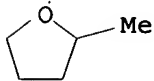
IT 96-47-9, 2-Methyltetrahydrofuran 109-99-9, THF, uses 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 143-24-8, Tetraglyme 646-06-0, 1,3-Dioxolane 25322-68-3, Polyethylene oxide 33454-82-9, Lithium trifluoromethane sulfonate 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide

RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(lithium sulfur battery electrolytes)

RN 96-47-9 HCAPLUS

CN Furan, tetrahydro-2-methyl- (CA INDEX NAME)



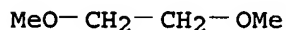
RN 109-99-9 HCAPLUS

CN Furan, tetrahydro- (CA INDEX NAME)



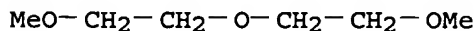
RN 110-71-4 HCAPLUS

CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



RN 111-96-6 HCAPLUS

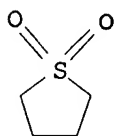
CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)



RN 126-33-0 HCAPLUS

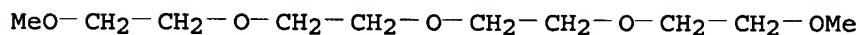
CN Thiophene, tetrahydro-, 1,1-dioxide (CA INDEX NAME)





RN 143-24-8 HCAPLUS

CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)

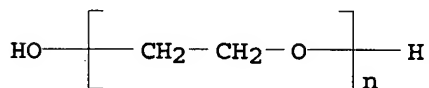


RN 646-06-0 HCAPLUS

CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)

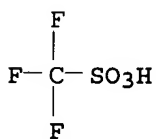


RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX NAME)

RN 33454-82-9 HCAPLUS

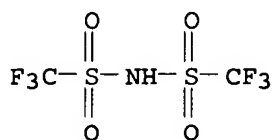
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L83 ANSWER 4 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:673529 HCAPLUS

DN 143:176219

TI Methods of charging lithium sulfur battery cells

IN Mikhaylik, Yuriy V.

PA Moltech Corporation, USA; Sion Power of Corporation

SO PCT Int. Appl., 37 pp.

CODEN: PIXXD2

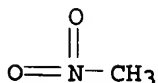
DT Patent

LA English

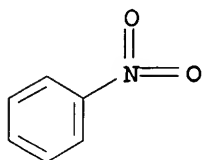
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005069405	A2	20050728	WO 2005-US495	20050106
	WO 2005069405	A3	20060817		
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, SM				
	RW:				
	BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	CA 2552645	A1	20050728	CA 2005-2552645	20050106
	EP 1714339	A2	20061025	EP 2005-705255	20050106
	R:				
	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU				
PRAI	US 2004-753123	A	20040106		
	WO 2005-US495	W	20050106		
AB	A method of charging a lithium-sulfur electrochem. cell is described wherein the lithium-sulfur cell comprises a cathode comprising an electroactive sulfur-containing material, an anode comprising lithium, and a nonaq. electrolyte. The cells, which deliver a high percentage of the theor. discharge capacity, exhibit a high charge-discharge efficiency and/or show low self-discharge rates, contain electrolytes with $\geq 1$ N-O compound in a concentration of about 0.02M to about 2.0M.				
IC	ICM H01M				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy				

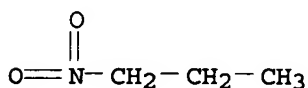
Technology)  
 ST lithium sulfur battery charging  
 electrolyte  
 IT Ethers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (cyclic; methods of charging lithium sulfur  
 battery cells)  
 IT Secondary batteries  
 (lithium; lithium-sulfur battery with  
 improved discharge capacity and high charge-discharge efficiency with  
 electrolyte containing nitrogen-oxygen compound)  
 IT 7439-93-2, Lithium, uses : 7704-34-9, Sulfur, uses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium-sulfur battery with improved  
 discharge capacity and high charge-discharge efficiency with  
 electrolyte containing nitrogen-oxygen compound)  
 IT 75-52-5, Nitromethane, uses 98-95-3,  
 Nitrobenzene, uses 108-03-2, 1-Nitropropane  
 506-93-4, Guanidine nitrate 543-53-3, Pyridinium  
 nitrate 556-65-0, Lithium thiocyanate 610-39-9  
 , 3,4-Dinitrotoluene 1321-12-6, Nitrotoluene  
 2564-83-2, Tempo 6484-52-2, Ammonium nitrate,  
 uses 7757-79-1, Potassium nitrate, uses  
 7758-09-0, Potassium nitrite 7789-18-6, Cesium  
 nitrate 7790-69-4, Lithium nitrate  
 10022-31-8, Barium nitrate 25154-54-5,  
 DiNitrobenzene 33454-82-9, Lithium triflate  
 52006-62-9, Nitrobutane 56778-64-4,  
 Nitropyridine 90076-65-6 143314-14-1,  
 1-Ethyl-3-methylimidazolium nitrate  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (lithium-sulfur battery with improved  
 discharge capacity and high charge-discharge efficiency with  
 electrolyte containing nitrogen-oxygen compound)  
 IT 75-52-5, Nitromethane, uses 98-95-3,  
 Nitrobenzene, uses 108-03-2, 1-Nitropropane  
 506-93-4, Guanidine nitrate 556-65-0, Lithium  
 thiocyanate 610-39-9, 3,4-Dinitrotoluene  
 1321-12-6, Nitrotoluene 2564-83-2, Tempo  
 6484-52-2, Ammonium nitrate, uses 7757-79-1,  
 Potassium nitrate, uses 7758-09-0, Potassium  
 nitrite 7789-18-6, Cesium nitrate  
 7790-69-4, Lithium nitrate 10022-31-8, Barium  
 nitrate 25154-54-5, DiNitrobenzene  
 33454-82-9, Lithium triflate 56778-64-4,  
 Nitropyridine 90076-65-6 143314-14-1,  
 1-Ethyl-3-methylimidazolium nitrate  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (lithium-sulfur battery with improved  
 discharge capacity and high charge-discharge efficiency with  
 electrolyte containing nitrogen-oxygen compound)  
 RN 75-52-5 HCAPLUS  
 CN Methane, nitro- (CA INDEX NAME)



RN 98-95-3 HCAPLUS  
CN Benzene, nitro- (CA INDEX NAME)



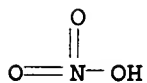
RN 108-03-2 HCAPLUS  
CN Propane, 1-nitro- (CA INDEX NAME)



RN 506-93-4 HCAPLUS  
CN Guanidine, mononitrate (8CI, 9CI) (CA INDEX NAME)

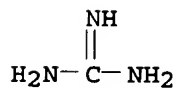
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CMF H N O3

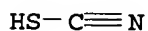


CM 2

CRN 113-00-8  
CMF C H5 N3

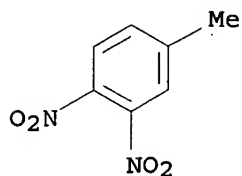


RN 556-65-0 HCAPLUS  
CN Thiocyanic acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 610-39-9 HCAPLUS  
CN Benzene, 4-methyl-1,2-dinitro- (CA INDEX NAME)



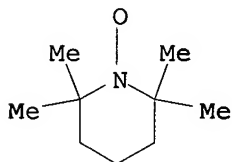
RN 1321-12-6 HCAPLUS  
CN Benzene, methylnitro- (CA INDEX NAME)



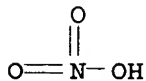
D1-Me

D1-NO<sub>2</sub>

RN 2564-83-2 HCAPLUS  
CN 1-Piperidinyloxy, 2,2,6,6-tetramethyl- (9CI) (CA INDEX NAME)

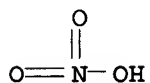


RN 6484-52-2 HCAPLUS  
CN Nitric acid ammonium salt (1:1) (CA INDEX NAME)



● NH<sub>3</sub>

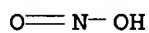
RN 7757-79-1 HCAPLUS  
CN Nitric acid potassium salt (1:1) (CA INDEX NAME)



● K

RN 7758-09-0 HCAPLUS

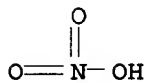
CN Nitrous acid, potassium salt (8CI, 9CI) (CA INDEX NAME)



● K

RN 7789-18-6 HCAPLUS

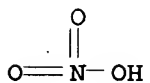
CN Nitric acid, cesium salt (1:1) (CA INDEX NAME)



● Cs

RN 7790-69-4 HCAPLUS

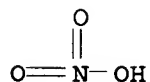
CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 10022-31-8 HCAPLUS

CN Nitric acid, barium salt (2:1) (CA INDEX NAME)



● 1/2 Ba

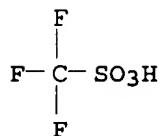
RN 25154-54-5 HCAPLUS

CN Benzene, dinitro- (CA INDEX NAME)

2 [ D1-NO<sub>2</sub> ]

RN 33454-82-9 HCAPLUS

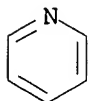
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

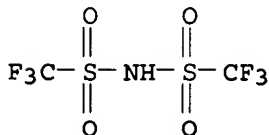
RN 56778-64-4 HCAPLUS

CN Pyridine, nitro- (9CI) (CA INDEX NAME)

D1-NO<sub>2</sub>

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)

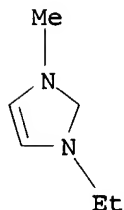


● Li

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CN 1H-Imidazolium, 3-ethyl-1-methyl-, nitrate (1:1) (CA INDEX NAME)

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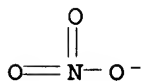
CRN 65039-03-4  
CMF C6 H11 N2



ONE OR MORE TAUTOMERIC DOUBLE BONDS NOT DISPLAYED IN THE STRUCTURE

CM 2

CRN 14797-55-8  
CMF N O3



L83 ANSWER 5 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:592008 HCAPLUS

DN 143:100401

TI **Electrolytes for lithium sulfur  
batteries**

IN Mikhaylik, Yuriy V.

PA Moltech Corp., USA

SO U.S. Pat. Appl. Publ., 18 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2005147886	A1	20050707	US 2004-753031	20040106
	CA 2552418	A1	20050728	CA 2005-2552418	20050106
	WO 2005069409	A2	20050728	WO 2005-US494	20050106
	WO 2005069409	A3	20050915		
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RW:	BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT,				



RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,  
MR, NE, SN, TD, TG

EP 1702383 A2 20060920 EP 2005-705254 20050106  
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, SI, LT, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK, IS

PRAI US 2004-753031 A 20040106  
WO 2005-US494 W 20050106

AB Disclosed is an electrochem. cell comprising a lithium  
anode and a sulfur-containing cathode and a nonaq.  
electrolyte. The cell exhibits high utilization of the  
electroactive sulfur-containing material of the cathode  
and a high charge-discharge efficiency.

IC ICM H01M004-58  
ICS H01M010-40

INCL 429218100; 429231950; 429326000; 429329000; 429339000; 429340000;  
429341000; 429337000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy  
Technology)

ST electrolyte lithium sulfur battery

IT Ethers, uses  
RL: DEV (Device component use); USES (Uses)  
(cyclic; electrolytes for lithium sulfur  
batteries)

IT Battery electrolytes  
(electrolytes for lithium sulfur  
batteries)

IT Ethers, uses  
Polyethers, uses  
Sulfones  
RL: DEV (Device component use); USES (Uses)  
(electrolytes for lithium sulfur  
batteries)

IT Nitrates, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolytes for lithium sulfur  
batteries)

IT Nitrites  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolytes for lithium sulfur  
batteries)

IT Secondary batteries  
(lithium; electrolytes for lithium sulfur  
batteries)

IT Nitro compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(organic; electrolytes for lithium sulfur  
batteries)

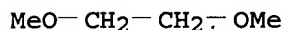
IT 110-71-4 646-06-0, Dioxolane 7439-93-2, Lithium, uses  
7439-93-2D, Lithium, salts 7704-34-9, Sulfur, uses  
RL: DEV (Device component use); USES (Uses)  
(electrolytes for lithium sulfur  
batteries)

IT 75-52-5, Nitromethane, uses 98-95-3,  
Nitrobenzene, uses 108-03-2, 1-Nitropropane  
506-93-4, Guanidinium nitrate 556-65-0,  
Lithium thiocyanate 1321-12-6, Nitrotoluene  
2564-83-2, Tempo 6484-52-2, Ammonium nitrate,  
uses 7757-79-1, Potassium nitrate, uses  
7758-09-0, Potassium nitrite 7789-18-6, Cesium  
nitrate 7790-69-4, Lithium nitrate

10022-31-8, Barium nitrate 13446-48-5,  
 Ammonium nitrite 13454-83-6, Cesium nitrite  
 13568-33-7, Lithium nitrite 25154-54-5,  
 DiNitrobenzene 25321-14-6, DiNitrotoluene  
 25322-01-4, Nitropropane 33454-82-9, Lithium  
 triflate 56778-64-4, Nitropyridine 90076-65-6  
 143314-14-1, 1-Ethyl-3-methylimidazolium nitrate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolytes for lithium sulfur  
 batteries)

IT 110-71-4 646-06-0, Dioxolane  
 RL: DEV (Device component use); USES (Uses)  
 (electrolytes for lithium sulfur  
 batteries)

RN 110-71-4 HCAPLUS  
 CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)

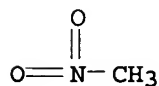


RN 646-06-0 HCAPLUS  
 CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)

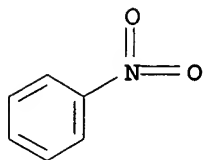


IT 75-52-5, Nitromethane, uses 98-95-3,  
 Nitrobenzene, uses 108-03-2, 1-Nitropropane  
 506-93-4, Guanidinium nitrate 556-65-0,  
 Lithium thiocyanate 1321-12-6, Nitrotoluene  
 2564-83-2, Tempo 6484-52-2, Ammonium nitrate,  
 uses 7757-79-1, Potassium nitrate, uses  
 7758-09-0, Potassium nitrite 7789-18-6, Cesium  
 nitrate 7790-69-4, Lithium nitrate  
 10022-31-8, Barium nitrate 13446-48-5,  
 Ammonium nitrite 13454-83-6, Cesium nitrite  
 13568-33-7, Lithium nitrite 25154-54-5,  
 DiNitrobenzene 25321-14-6, DiNitrotoluene  
 25322-01-4, Nitropropane 33454-82-9, Lithium  
 triflate 56778-64-4, Nitropyridine 90076-65-6  
 143314-14-1, 1-Ethyl-3-methylimidazolium nitrate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolytes for lithium sulfur  
 batteries)

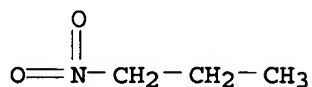
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 CN Methane, nitro- (CA INDEX NAME)



RN 98-95-3 HCAPLUS  
 CN Benzene, nitro- (CA INDEX NAME)



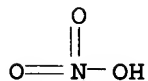
RN 108-03-2 HCAPLUS  
CN Propane, 1-nitro- (CA INDEX NAME)



RN 506-93-4 HCAPLUS  
CN Guanidine, mononitrate (8CI, 9CI) (CA INDEX NAME)

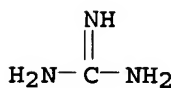
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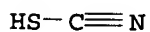


CM 2

CRN 113-00-8  
CMF C H5 N3



RN 556-65-0 HCAPLUS  
CN Thiocyanic acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 1321-12-6 HCAPLUS  
CN Benzene, methylnitro- (CA INDEX NAME)

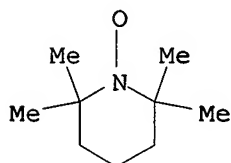


D1-Me

D1-NO<sub>2</sub>

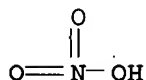
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CN 1-Piperidinyloxy, 2,2,6,6-tetramethyl- (9CI) (CA INDEX NAME)



RN 6484-52-2 HCAPLUS

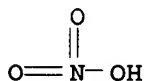
CN Nitric acid ammonium salt (1:1) (CA INDEX NAME)



● NH<sub>3</sub>

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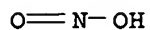
CN Nitric acid potassium salt (1:1) (CA INDEX NAME)



● K

RN 7758-09-0 HCAPLUS

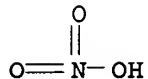
CN Nitrous acid, potassium salt (8CI, 9CI) (CA INDEX NAME)



● K

RN 7789-18-6 HCAPLUS

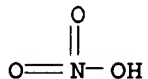
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● Cs

RN 7790-69-4 HCAPLUS

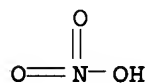
CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 10022-31-8 HCAPLUS

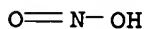
CN Nitric acid, barium salt (2:1) (CA INDEX NAME)



● 1/2 Ba

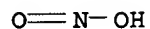
RN 13446-48-5 HCAPLUS

CN Nitrous acid, ammonium salt (8CI, 9CI) (CA INDEX NAME)

● NH<sub>3</sub>

RN 13454-83-6 HCAPLUS

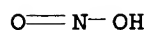
CN Nitrous acid, cesium salt (8CI, 9CI) (CA INDEX NAME)



● Cs

RN 13568-33-7 HCAPLUS

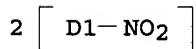
CN Nitrous acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 25154-54-5 HCAPLUS

CN Benzene, dinitro- (CA INDEX NAME)

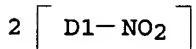


RN 25321-14-6 HCAPLUS

CN Benzene, methyldinitro- (9CI) (CA INDEX NAME)



D1-Me



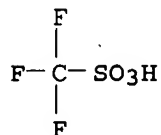
RN 25322-01-4 HCAPLUS

CN Propane, nitro- (CA INDEX NAME)

D1-NO<sub>2</sub>

RN 33454-82-9 HCAPLUS

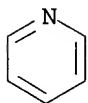
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

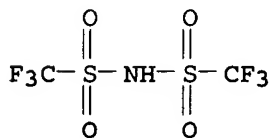
RN 56778-64-4 HCAPLUS

CN Pyridine, nitro- (9CI) (CA INDEX NAME)

D1-NO<sub>2</sub>

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

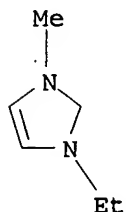
RN 143314-14-1 HCAPLUS

CN 1H-Imidazolium, 3-ethyl-1-methyl-, nitrate (1:1) (CA INDEX NAME)

CM 1

CRN 65039-03-4

CMF C6 H11 N2

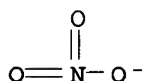


ONE OR MORE TAUTOMERIC DOUBLE BONDS NOT DISPLAYED IN THE STRUCTURE

CM 2

CRN 14797-55-8

CMF N 03



L83 ANSWER 6 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:588319 HCAPLUS

DN 143:100355

TI **Electrolytes for lithium sulfur batteries**

IN Mikhaylik, Yuriy V.

PA Moltech Corp., USA

SO U.S. Pat. Appl. Publ., 18 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

*application*

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2005147891	A1	20050707	<u>US 2004-752876</u>	20040106
	CA 2552563	A1	20050728	CA 2005-2552563	20050106
	WO 2005069404	A2	20050728	WO 2005-US493	20050106
	WO 2005069404	A3	20060615		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, SM				
RW:	BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP	1726052	A2	20061129	EP 2005-705253	20050106
R:	AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, AL, BA, HR, LV, MK, YU				
PRAI	US 2004-752876	A	20040106		



WO 2005-US493 W 20050106

AB Disclosed is an additive for an electrochem. cell wherein the additive includes an N-O bond. The additive is most preferably included in a monaq. electrolyte of the cell. Also disclosed are cells and batteries including the additive, and methods of charging the batteries and cells. An electrochem. cell including the additive preferably has an anode that includes lithium and a cathode including an electroactive sulfur-containing material.

IC ICM H01M010-40  
ICS H01M004-58

INCL 429326000; 429339000; 429218100; 429231950; 429329000; 429340000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST electrolyte lithium sulfur battery

IT Ethers, uses  
RL: DEV (Device component use); USES (Uses)  
(cyclic; electrolytes for lithium sulfur batteries)

IT Battery cathodes  
Battery electrolytes  
(electrolytes for lithium sulfur batteries)

IT Ethers, uses  
Polyethers, uses  
Sulfones  
RL: DEV (Device component use); USES (Uses)  
(electrolytes for lithium sulfur batteries)

IT Nitrates, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolytes for lithium sulfur batteries)

IT Nitrites  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolytes for lithium sulfur batteries)

IT Secondary batteries  
(lithium; electrolytes for lithium sulfur batteries)

IT Nitro compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(organic; electrolytes for lithium sulfur batteries)

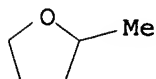
IT 96-47-9, 2-Methyltetrahydrofuran 109-87-5,  
Dimethoxymethane 109-99-9, Thf, uses 110-71-4  
111-96-6, Diethylene glycol dimethyl ether  
112-49-2, Triethylene glycol dimethyl ether  
123-91-1, 1,4-Dioxane, uses 142-68-7, Tetrahydropyran  
143-24-8, Tetraethylene glycol dimethyl ether  
149-73-5, Trimethoxymethane 505-22-6, 1,3-Dioxane  
556-65-0, Lithium thiocyanate 646-06-0, 1,3-Dioxolane  
7439-93-2, Lithium, uses 7439-93-2D, Lithium, salt 7704-34-9, Sulfur,  
uses 17081-21-9, 1,3-Dimethoxypropane 33454-82-9,  
Lithium triflate 73506-93-1, Diethoxyethane 90076-65-6  
111109-77-4, Dipropylene glycol dimethyl ether  
RL: DEV (Device component use); USES (Uses)  
(electrolytes for lithium sulfur batteries)

IT 75-52-5, Nitromethane, uses 77-79-2,  
3-Sulfolene 98-95-3, Nitrobenzene, uses  
108-03-2, 1-Nitropropane 126-33-0, Sulfolane  
506-93-4, Guanidinium nitrate 610-39-9, 3,4-  
Dinitrotoluene 872-93-5, 3-MethylSulfolane  
1321-12-6, Nitrotoluene 2564-83-2, Tempo  
6484-52-2, Ammonium nitrate, uses 7757-79-1,  
Potassium nitrate, uses 7758-09-0, Potassium  
nitrite 7789-18-6, Cesium nitrate  
7790-69-4, Lithium nitrate 10022-31-8, Barium  
nitrate 13446-48-5, Ammonium nitrite  
13454-83-6, Cesium nitrite 13568-33-7, Lithium  
nitrite 25154-54-5, DiNitrobenzene  
25321-14-6, DiNitrotoluene 25322-01-4,  
Nitropropane 56778-64-4, Nitropyridine  
143314-14-1, 1-Ethyl-3-methylimidazolium nitrate  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolytes for lithium sulfur  
batteries)

IT 96-47-9, 2-Methyltetrahydrofuran 109-87-5,  
Dimethoxymethane 109-99-9, Thf, uses 110-71-4  
111-96-6, Diethylene glycol dimethyl ether  
112-49-2, Triethylene glycol dimethyl ether  
123-91-1, 1,4-Dioxane, uses 142-68-7, Tetrahydropyran  
143-24-8, Tetraethylene glycol dimethyl ether  
149-73-5, Trimethoxymethane 505-22-6, 1,3-Dioxane  
556-65-0, Lithium thiocyanate 646-06-0, 1,3-Dioxolane  
17081-21-9, 1,3-Dimethoxypropane 33454-82-9, Lithium  
triflate 73506-93-1, Diethoxyethane 90076-65-6  
111109-77-4, Dipropylene glycol dimethyl ether  
RL: DEV (Device component use); USES (Uses)  
(electrolytes for lithium sulfur  
batteries)

RN 96-47-9 HCAPLUS  
CN Furan, tetrahydro-2-methyl- (CA INDEX NAME)

*solvent*



RN 109-87-5 HCAPLUS  
CN Methane, dimethoxy- (CA INDEX NAME)

*solvent*

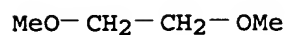


RN 109-99-9 HCAPLUS  
CN Furan, tetrahydro- (CA INDEX NAME)



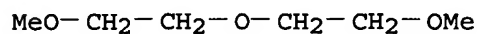
*solvent*

RN 110-71-4 HCAPLUS  
CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



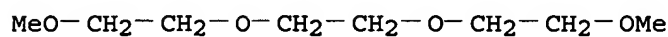
*solvent*

RN 111-96-6 HCAPLUS  
CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)



*solvent*

RN 112-49-2 HCAPLUS  
CN 2,5,8,11-Tetraoxadodecane (CA INDEX NAME)



*solvent*

RN 123-91-1 HCAPLUS  
CN 1,4-Dioxane (CA INDEX NAME)



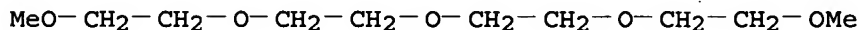
*solvent*

RN 142-68-7 HCAPLUS  
CN 2H-Pyran, tetrahydro- (CA INDEX NAME)



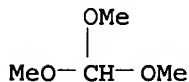
*solvent*

RN 143-24-8 HCAPLUS  
CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)



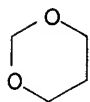
*solvent*

RN 149-73-5 HCAPLUS  
CN Methane, trimethoxy- (CA INDEX NAME)

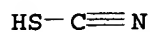


*solvent*

RN 505-22-6 HCAPLUS  
CN 1,3-Dioxane (9CI) (CA INDEX NAME)

*solvent*

RN 556-65-0 HCAPLUS  
CN Thiocyanic acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

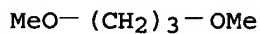


● Li

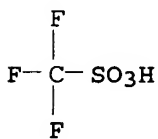
RN 646-06-0 HCAPLUS  
CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)

*solvent*

RN 17081-21-9 HCAPLUS  
CN Propane, 1,3-dimethoxy- (CA INDEX NAME)

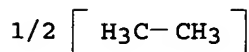
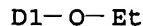
*solvent*

RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

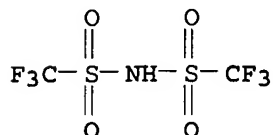


● Li

RN 73506-93-1 HCAPLUS  
CN Ethane, diethoxy- (9CI) (CA INDEX NAME)

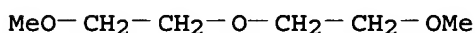
*solvent*

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



● Li

RN 111109-77-4 HCAPLUS  
 CN Propane, oxybis[methoxy- (9CI) (CA INDEX NAME)

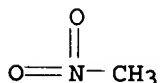


*solvent*

2 ( D1-Me )

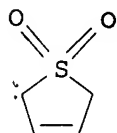
IT 75-52-5, Nitromethane, uses 77-79-2,  
 3-Sulfolene 98-95-3, Nitrobenzene, uses  
 108-03-2, 1-Nitropropane 126-33-0, Sulfolane  
 506-93-4, Guanidinium nitrate 610-39-9, 3,4-  
 Dinitrotoluene 872-93-5, 3-MethylSulfolane  
 1321-12-6, Nitrotoluene 2564-83-2, Tempo  
 6484-52-2, Ammonium nitrate, uses 7757-79-1,  
 Potassium nitrate, uses 7758-09-0, Potassium  
 nitrite 7789-18-6, Cesium nitrate  
 7790-69-4, Lithium nitrate 10022-31-8, Barium  
 nitrate 13446-48-5, Ammonium nitrite  
 13454-83-6, Cesium nitrite 13568-33-7, Lithium  
 nitrite 25154-54-5, DiNitrobenzene  
 25321-14-6, DiNitrotoluene 25322-01-4,  
 Nitropropane 56778-64-4, Nitropyridine  
 143314-14-1, 1-Ethyl-3-methylimidazolium nitrate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolytes for lithium sulfur  
 batteries)

RN 75-52-5 HCAPLUS  
 CN Methane, nitro- (CA INDEX NAME)



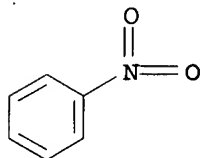
*N-O*

RN 77-79-2 HCAPLUS  
 CN Thiophene, 2,5-dihydro-, 1,1-dioxide (CA INDEX NAME)



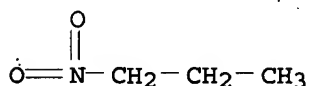
*solvent*

RN 98-95-3 HCAPLUS  
CN Benzene, nitro- (CA INDEX NAME)



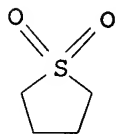
*N-O*

RN 108-03-2 HCAPLUS  
CN Propane, 1-nitro- (CA INDEX NAME)



*N-O*

RN 126-33-0 HCAPLUS  
CN Thiophene, tetrahydro-, 1,1-dioxide (CA INDEX NAME)

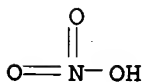


*solvent*

RN 506-93-4 HCAPLUS  
CN Guanidine, mononitrate (8CI, 9CI) (CA INDEX NAME)

CM 1

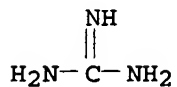
CRN 7697-37-2  
CMF H N O3



*N-O*

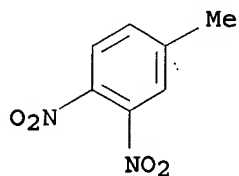
CM 2

CRN 113-00-8  
CMF C H5 N3



RN 610-39-9 HCAPLUS

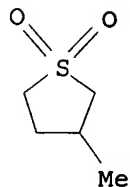
CN Benzene, 4-methyl-1,2-dinitro- (CA INDEX NAME)



N-O

RN 872-93-5 HCAPLUS

CN Thiophene, tetrahydro-3-methyl-, 1,1-dioxide (CA INDEX NAME)



solvent

RN 1321-12-6 HCAPLUS

CN Benzene, methylnitro- (CA INDEX NAME)



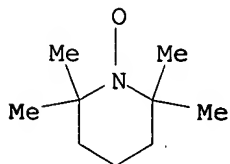
D1-Me

N-O

D1-NO2

RN 2564-83-2 HCAPLUS

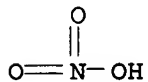
CN 1-Piperidinyloxy, 2,2,6,6-tetramethyl- (9CI) (CA INDEX NAME)



N-O

RN 6484-52-2 HCAPLUS

CN Nitric acid ammonium salt (1:1) (CA INDEX NAME)

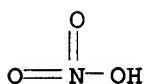


N-O

● NH<sub>3</sub>

RN 7757-79-1 HCAPLUS

CN Nitric acid potassium salt (1:1) (CA INDEX NAME)

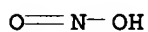


N-O

● K

RN 7758-09-0 HCAPLUS

CN Nitrous acid, potassium salt (8CI, 9CI) (CA INDEX NAME)

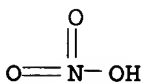


N-O

● K

RN 7789-18-6 HCAPLUS

CN Nitric acid, cesium salt (1:1) (CA INDEX NAME)



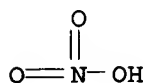
N-O

● Cs

RN 7790-69-4 HCAPLUS

CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

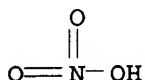




N-O

● Li

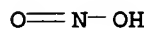
RN 10022-31-8 HCAPLUS  
CN Nitric acid, barium salt (2:1) (CA INDEX NAME)



N-O

● 1/2 Ba

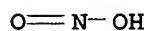
RN 13446-48-5 HCAPLUS  
CN Nitrous acid, ammonium salt (8CI, 9CI) (CA INDEX NAME)



N-O

● NH<sub>3</sub>

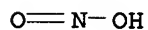
RN 13454-83-6 HCAPLUS  
CN Nitrous acid, cesium salt (8CI, 9CI) (CA INDEX NAME)



N-O

● Cs

RN 13568-33-7 HCAPLUS  
CN Nitrous acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



N-O

● Li

RN 25154-54-5 HCAPLUS  
CN Benzene, dinitro- (CA INDEX NAME)



N-O

2 [ D1-NO<sub>2</sub> ]

RN 25321-14-6 HCAPLUS  
CN Benzene, methyldinitro- (9CI) (CA INDEX NAME)



D1-Me

N-O

2 [ D1-NO<sub>2</sub> ]

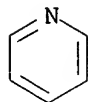
RN 25322-01-4 HCAPLUS  
CN Propane, nitro- (CA INDEX NAME)

H<sub>3</sub>C-CH<sub>2</sub>-CH<sub>3</sub>

N-O

D1-NO<sub>2</sub>

RN 56778-64-4 HCAPLUS  
CN Pyridine, nitro- (9CI) (CA INDEX NAME)



N-O

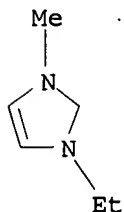
D1-NO<sub>2</sub>

RN 143314-14-1 HCAPLUS  
CN 1H-Imidazolium, 3-ethyl-1-methyl-, nitrate (1:1) (CA INDEX NAME)

CM 1

CRN 65039-03-4

CMF C6 H11 N2

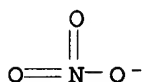


ONE OR MORE TAUTOMERIC DOUBLE BONDS NOT DISPLAYED IN THE STRUCTURE

CM 2

CRN 14797-55-8

CMF N 03



N- O

L83 ANSWER 7 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:219895 HCAPLUS

DN 140:238515

TI **Electrolyte** for lithium secondary batteries

IN Jung, Yongiu; Kim, Seok; Kim, Jan-Dee

PA Samsung Sdi Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 8 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004053129	A1	20040318	US 2003-659363	20030911
	KR 2004023880	A	20040320	KR 2002-55319	20020912
	JP 2004103558	A	20040402	JP 2003-174686	20030619
	CN 1495957	A	20040512	CN 2003-127282	20030912
PRAI	KR 2002-55319	A	20020912		

AB An **electrolyte** in a lithium secondary battery includes an alkyl ammonium salt having a cation of the following Formula ([NR<sub>1-4</sub>]<sup>+</sup>), a lithium salt, and an organic solvent; wherein R<sub>1</sub> to R<sub>4</sub> are independently a C1-6 alkyl, a C2-6 alkenyl, or substituents thereof. The lithium secondary battery has improved cycle life, high rate characteristics, and a high energy d. due to an increase of the average discharge voltage at a high rate.

IC ICM H01M010-40

INCL 429188000; 429330000

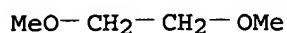
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **electrolyte** lithium secondary batteryIT **Battery electrolytes**

(Li-S; electrolyte for lithium secondary batteries)

- IT Carbonates, uses  
RL: DEV (Device component use); USES (Uses)  
(acyclic; **electrolyte** for lithium secondary batteries)
- IT Ethers, uses  
RL: DEV (Device component use); USES (Uses)  
(bicyclic; **electrolyte** for lithium secondary batteries)
- IT Aromatic compounds  
Esters, uses  
Ketones, uses  
Lactones  
Sulfates, uses  
Sulfites  
Sulfoxides  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for lithium secondary batteries)
- IT Secondary batteries  
(lithium; **electrolyte** for lithium secondary batteries)
- IT Heterocyclic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrogen; **electrolyte** for lithium secondary batteries)
- IT Heterocyclic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(oxygen; **electrolyte** for lithium secondary batteries)
- IT Imides  
Sulfonic acids, uses  
RL: DEV (Device component use); USES (Uses)  
(sulfonimides, perfluoro derivatives, lithium salts; **electrolyte** for lithium secondary batteries)
- IT Heterocyclic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(sulfur; **electrolyte** for lithium secondary batteries)
- IT Quaternary ammonium compounds, uses  
RL: DEV (Device component use); USES (Uses)  
(tetraalkyl; **electrolyte** for lithium secondary batteries)
- IT 66-40-0, Tetraethylammonium 110-71-4 646-06-0,  
Dioxolane 3109-63-5, Tetrabutylammonium hexafluorophosphate 7447-41-8,  
Lithium chloride (LiCl), uses 7704-34-9, Sulfur, uses 7791-03-9,  
Lithium perchlorate 10377-51-2, Lithium iodide (LiI) 10549-76-5,  
Tetrabutylammonium 14024-11-4, Lithium tetrachloroaluminate  
14283-07-9, Lithium tetrafluoroborate 14797-73-0, Perchlorate  
14874-70-5, Tetrafluoroborate 16919-18-9, Hexafluorophosphate  
16973-45-8, Hexafluoroarsenate 18424-17-4, Lithium hexafluoroantimonate  
20256-54-6, Tetrahexylammonium 21324-40-3, Lithium hexafluorophosphate  
29935-35-1, Lithium hexafluoroarsenate 37181-39-8,  
Trifluoromethylsulfonate 50653-68-4 82113-65-3,  
Bis(trifluoromethylsulfonyl)imide 90076-65-6 129318-46-3,  
Bis(perfluoroethylsulfonyl)imide 131651-65-5, Lithium  
nonafluorobutanesulfonate  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for lithium secondary batteries)
- IT 110-71-4 646-06-0, Dioxolane 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for lithium secondary batteries)

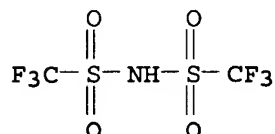
RN 110-71-4 HCAPLUS  
CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



RN 646-06-0 HCAPLUS  
CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 90076-65-6 HCAPLUS  
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

L83 ANSWER 8 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:39666 HCAPLUS

DN 140:79836

TI **Electrolyte of lithium-sulfur batteries**

IN Kim, Seok; Jung, Yongju; Kim, Jan-Dee

PA Samsung SDI Co., Ltd, S. Korea

SO U.S. Pat. Appl. Publ., 15 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004009393	A1	20040115	US 2003-617230	20030711
	KR 2004006429	A	20040124	KR 2002-40707	20020712
	JP 2005108438	A	20050421	JP 2003-183188	20030626
	CN 1487620	A	20040407	CN 2003-154619	20030712
PRAI	KR 2002-40707	A	20020712		

AB An electrolyte for use in a lithium-sulfur battery includes salts having imide anions. The electrolyte may further include salts having organic cations. When lithium-sulfur batteries include salts having imide anions as electrolytes, the sulfur utilization is increased, and cycle life characteristics and discharge characteristics such as discharge capacity and average discharge voltage are improved.

IC ICM H01M010-40

ICS H01M004-58

INCL 429188000; 429330000; 429218100; 429340000; 429341000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST electrolyte lithium sulfur battery

IT Polyoxyalkylenes, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(alkylated, binder; electrolyte of lithium-sulfur batteries)

IT Fluoropolymers, uses

Polyoxyalkylenes, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(binder; electrolyte of lithium-sulfur batteries)

IT Polyoxyalkylenes, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(crosslinked, binder; electrolyte of lithium-sulfur batteries)

IT Ethers, uses

RL: DEV (Device component use); USES (Uses)  
(cyclic, bicyclic; electrolyte of lithium-sulfur batteries)

IT Battery electrolytes

(electrolyte of lithium-sulfur batteries)

IT Aromatic compounds

Esters, uses

Heterocyclic compounds

Imides

Ketones, uses

Lactones

Sulfates, uses

Sulfites

Sulfoxides

RL: DEV (Device component use); USES (Uses)  
(electrolyte of lithium-sulfur batteries)

IT Group IIIA elements

RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte of lithium-sulfur batteries)

IT Group IVA elements

RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte of lithium-sulfur batteries)

IT Transition metals, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte of lithium-sulfur batteries)

IT Secondary batteries

(lithium; electrolyte of lithium-sulfur batteries)

IT Heterocyclic compounds

RL: MOA (Modifier or additive use); USES (Uses)  
(nitrogen, Li protecting compound; electrolyte of lithium-sulfur batteries)

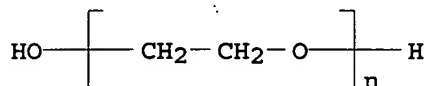
IT Heterocyclic compounds

RL: MOA (Modifier or additive use); USES (Uses)  
(oxygen, Li protecting compound; electrolyte of lithium-sulfur batteries)

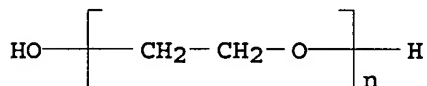
- IT **Ethers, uses**  
RL: MOA (Modifier or additive use); USES (Uses)  
(saturated, Li protecting compound; electrolyte of lithium-sulfur batteries)
- IT **Heterocyclic compounds**  
RL: MOA (Modifier or additive use); USES (Uses)  
(sulfur, Li protecting compound; electrolyte of lithium-sulfur batteries)
- IT **Ethers, uses**  
RL: MOA (Modifier or additive use); USES (Uses)  
(unsatd., Li protecting compound; electrolyte of lithium-sulfur batteries)
- IT **Lithium alloy, base**  
RL: DEV (Device component use); USES (Uses)  
(electrolyte of lithium-sulfur batteries)
- IT 9002-84-0, Ptfе 9002-86-2, Polyvinyl chloride 9002-89-5, Polyvinyl alcohol 9003-19-4, Polyvinyl ether 9003-20-7, Polyvinyl acetate 9003-32-1, Polyethyl acrylate 9003-39-8, Polyvinyl pyrrolidone 9003-47-8, Polyvinylpyridine 9003-53-6, Polystyrene 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 25322-68-3D, Peo, alkylated 25322-68-3D, Peo, crosslinked  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; electrolyte of lithium-sulfur batteries)
- IT 110-71-4 463-79-6D, Carbonic acid, acyclic compound 463-79-6D, Carbonic acid, bicyclic salt 646-06-0, Dioxolane 7439-93-2, Lithium, uses 14797-73-0, Perchlorate 14874-70-5, Tetrafluoroborate 16919-18-9, Hexafluorophosphate 16969-45-2D, Pyridinium, compound 16973-45-8, Hexafluoroarsenate 17009-90-4D, Imidazolium, compound 17009-91-5D, Pyrazolium, compound 17009-93-7D, Pyrazinium, compound 17009-95-9D, Pyrimidinium, compound 17009-97-1D, Pyridazinium, compound 28589-79-9D, Thiazolium, compound 37181-39-8, Trifluoromethylsulfonate 64001-57-6D, Oxazolium, compound 65039-03-4D, 1-Ethyl-3-methylimidazolium, compound 74432-42-1, Lithium polysulfide 80432-08-2, 1-Butyl-3-methylimidazolium 82113-65-3, Bis(trifluoromethylsulfonyl)imide 90076-65-6 129318-46-3, Bis(perfluoroethylsulfonyl)imide 132273-39-3 132843-44-8 157310-70-8D, 1H-Imidazolium, 1,2-dimethyl-3-propyl-, compound 174501-64-5, 1-Butyl-3-methylimidazolium hexafluorophosphate 216299-76-2  
RL: DEV (Device component use); USES (Uses)  
(electrolyte of lithium-sulfur batteries)
- IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-96-5, Manganese, uses 7439-97-6, Mercury, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-20-2, Scandium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-25-7, Tantalum, uses 7440-26-8, Technetium, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-43-9, Cadmium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-56-4, Germanium, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses 7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-74-6, Indium, uses  
RL: MOA (Modifier or additive use); USES (Uses)

(electrolyte of lithium-sulfur  
batteries)

IT 25322-68-3, Peo 25322-68-3D, Peo, alkylated  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; electrolyte of lithium-sulfur  
batteries)  
RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX  
NAME)

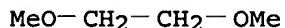


RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX  
NAME)



IT 110-71-4 646-06-0, Dioxolane 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(electrolyte of lithium-sulfur  
batteries)

RN 110-71-4 HCAPLUS  
CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)

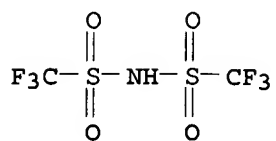


RN 646-06-0 HCAPLUS  
CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 90076-65-6 HCAPLUS  
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
lithium salt (9CI) (CA INDEX NAME)





● Li

L83 ANSWER 9 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2003:458493 HCAPLUS  
 DN 139:216878  
 TI Effect of Multiwalled Carbon Nanotubes on Electrochemical Properties of  
**Lithium/Sulfur Rechargeable Batteries**  
 AU Han, Sang-Cheol; Song, Min-Sang; Lee, Ho; Kim, Hyun-Seok; Ahn, Hyo-Jun;  
 Lee, Jai-Young  
 CS Department of Materials Science and Engineering, Korea Advanced Institute  
 of Science and Technology, Daejeon, 305-701, S. Korea  
 SO Journal of the Electrochemical Society (2003), 150(7), A889-A893  
 CODEN: JESOAN; ISSN: 0013-4651  
 PB Electrochemical Society  
 DT Journal  
 LA English  
 AB To bestow high electronic conductivity and prevent dissoln. of sulfur into the  
**electrolyte**, multi-walled carbon nanotubes (MWNTs) were prepared by  
 thermal CVD as an inactive additive material for elemental **sulfur**  
**pos. electrodes for lithium/sulfur**  
**rechargeable batteries**. The initial discharge capacity of  
 elemental **sulfur pos. electrode** with MWNT is  
 485 mAh/g sulfur at 2.0 V vs. Li/Li+. The cycle life and rate capability  
 of **sulfur cathode** is increased with addition of MWNT.  
 The MWNT shows a vital role on polysulfide adsorption and is a good elec.  
 conductor for a **sulfur cathode**.  
 CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy  
 Technology)  
 Section cross-reference(s): 49, 76  
 ST multiwalled carbon nanotube cond **lithium sulfur**  
**rechargeable battery CVD**  
 IT Fluoropolymers, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material  
 use); USES (Uses)  
 (blend with sulfur and acetylene black; effect of multi-walled carbon  
 nanotubes on electrochem. properties of **lithium/**  
**sulfur rechargeable batteries**)  
 IT Carbon black, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material  
 use); USES (Uses)  
 (blend with sulfur and polyvinylidene difluoride; effect of  
 multi-walled carbon nanotubes on electrochem. properties of  
**lithium/sulfur rechargeable batteries**)  
 IT Nanotubes  
 (carbon, multi-walled; effect of multi-walled carbon nanotubes on  
 electrochem. properties of **lithium/sulfur**  
**rechargeable batteries**)  
 IT Vapor deposition process  
 (chemical; effect of multi-walled carbon nanotubes on electrochem.

- properties of lithium/sulfur rechargeable batteries)
- IT Polysulfides  
RL: FMU (Formation, unclassified); NUU (Other use, unclassified); FORM (Formation, nonpreparative); USES (Uses)  
(effect of MWNTs on retention of lithium polysulfides at electrodes of lithium sulfur battery)
- IT Battery cathodes  
Cyclic voltammetry  
Electric conductivity  
Electric current-potential relationship  
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT Secondary batteries  
(lithium/sulfur; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT Thermal decomposition  
(of methane; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 7440-44-0P, Carbon, uses  
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(MWNTs; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 7704-34-9, Sulfur, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(blend with acetylene black and polyvinylidene difluoride; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 24937-79-9  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(blend with sulfur and acetylene black; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 1333-74-0, Hydrogen, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(catalyst reduction and MWNT feed gas; effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 122327-06-4P, Magnesium nickel oxide (Mg<sub>0.6</sub>Ni<sub>0.4</sub>O)  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)  
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 74-82-8, Methane, uses  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(effect of multi-walled carbon nanotubes on electrochem. properties of lithium/sulfur rechargeable batteries)
- IT 77-92-9, Citric acid, reactions 13446-18-9, Magnesium nitrate, hexahydrate 13478-00-7  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(effect of multi-walled carbon nanotubes on electrochem. properties of

lithium/sulfur rechargeable batteries)

IT 143-24-8, Tetraglyme 90076-65-6, Lithium  
bis(trifluoromethane sulfonyl)imide  
RL: DEV (Device component use); USES (Uses)  
(electrolyte; effect of multi-walled carbon nanotubes on  
electrochem. properties of lithium/sulfur  
rechargeable batteries)

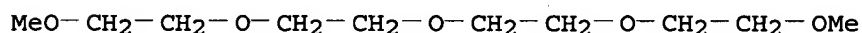
IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(foil, anode; effect of multi-walled carbon nanotubes on  
electrochem. properties of lithium/sulfur  
rechargeable batteries)

IT 7429-90-5, Aluminum, uses  
RL: DEV (Device component use); USES (Uses)  
(foil, cathode substrate; effect of multi-walled carbon nanotubes on  
electrochem. properties of lithium/sulfur  
rechargeable batteries)

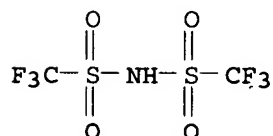
IT 9003-07-0, Celgard 2200  
RL: DEV (Device component use); USES (Uses)  
(porous, separator; effect of multi-walled carbon nanotubes on  
electrochem. properties of lithium/sulfur  
rechargeable batteries)

IT 143-24-8, Tetraglyme 90076-65-6, Lithium  
bis(trifluoromethane sulfonyl)imide  
RL: DEV (Device component use); USES (Uses)  
(electrolyte; effect of multi-walled carbon nanotubes on  
electrochem. properties of lithium/sulfur  
rechargeable batteries)

RN 143-24-8 HCAPLUS  
CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)



RN 90076-65-6 HCAPLUS  
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
lithium salt (9CI) (CA INDEX NAME)



● Li

IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(foil, anode; effect of multi-walled carbon nanotubes on  
electrochem. properties of lithium/sulfur  
rechargeable batteries)

RN 7439-93-2 HCAPLUS  
CN Lithium (CA INDEX NAME)

Li

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L83 ANSWER 10 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:298774 HCAPLUS

DN 138:324028

TI An electrolyte for lithium-sulfur  
batteries

IN Kim, Seok; Jung, Yong-Ju; Choi, Yun-Suk; Kim, Jan-Dee; Choi, Soo-Seok

PA Samsung SDI Co., Ltd., S. Korea

SO Eur. Pat. Appl., 14 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1302997	A2	20030416	EP 2002-19773	20020904
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
	US 2003073005	A1	20030417	US 2002-96663	20020314
	CN 1412882	A	20030423	CN 2002-132085	20020909
PRAI	US 2001-328807P	P	20011015		
	US 2002-96663	A	20020314		
AB	A lithium-sulfur battery includes a pos. electrode having at least one pos. active material selected from the group consisting of an elemental sulfur, $\text{Li}_2\text{Sn}$ ( $n \geq 1$ ), $\text{Li}_2\text{Sn}$ ( $n \geq 1$ ) dissolved in catholytes, an organosulfur compound, and a carbon-sulfur polymer ( $(\text{C}_2\text{S}_x)_n$ : $x = 2.5-50$ , $n \geq 2$ ), an electrolyte having salts of an organic cation, and a neg. electrode having a neg. active material selected from the group consisting of a material capable of reversibly intercalating/deintercalating lithium ions, a material capable of reversibly forming a lithium-containing compound by a reaction with lithium ions, a lithium metal, and a lithium alloy.				
IC	ICM H01M010-40				
	ICS H01M004-02				
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)				
ST	electrolyte lithium sulfur battery				
IT	Battery electrolytes (electrolyte for lithium-sulfur batteries)				
IT	Heterocyclic compounds RL: DEV (Device component use); USES (Uses) (electrolyte for lithium-sulfur batteries)				
IT	Secondary batteries (lithium; electrolyte for lithium-sulfur batteries)				
IT	Heterocyclic compounds RL: DEV (Device component use); USES (Uses) (nitrogen; electrolyte for lithium-sulfur batteries)				
IT	110-71-4 646-06-0, Dioxolane 7447-41-8, Lithium chloride ( $\text{LiCl}$ ), uses 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide ( $\text{LiI}$ ) 12355-58-7, Lithium aluminate ( $\text{Li}_5\text{AlO}_4$ ) 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium				

tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3,  
 Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 90076-65-6 131651-65-5,  
 Lithium perfluorobutanesulfonate 155371-19-0 174501-64-5,  
 1-Butyl-3-methylimidazolium hexafluorophosphate 216299-76-2  
 511542-00-0

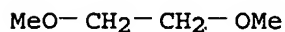
RL: DEV (Device component use); USES (Uses)  
 (electrolyte for lithium-sulfur  
 batteries)

IT 110-71-4 646-06-0, Dioxolane 33454-82-9,  
 Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
 (electrolyte for lithium-sulfur  
 batteries)

RN 110-71-4 HCAPLUS

CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



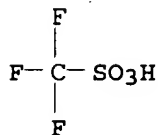
RN 646-06-0 HCAPLUS

CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 33454-82-9 HCAPLUS

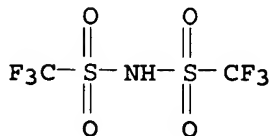
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



● Li

L83 ANSWER 11 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:964986 HCAPLUS

DN 138:15307

TI **Lithium-sulfur batteries with good cycle life characteristics**

IN Choi, Soo Seok; Choi, Yunsuk; Jung, Yongju; Lee, Jaewoan; Hwang, Duck Chul; Kim, Joo Soak; Park, Zin; Kim, Seok; Han, Ji Sung

PA Samsung SDI Co., Ltd., S. Korea

SO U.S. Pat. Appl. Publ., 16 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002192557	A1	20021219	US 2002-72907	<u>20020212</u>
	KR 2002092029	A	20021211	KR 2001-30878	20010601
	JP 2002367678	A	20021220	JP 2002-61349	20020307
	CN 1389948	A	20030108	CN 2002-116133	20020419
PRAI	KR 2001-30878	A	20010601		

AB **A lithium-sulfur battery having a pos. electrode including a pos. active material including an active sulfur, where the pos. electrode comprises an electron-conductive path and an ion-conductive path, and includes active pores of the average size of up to 20  $\mu$ m having both electron-conductive and ion-conductive properties, and are filled with the active sulfur during an electrochem. reaction of the battery.**

IC ICM H01M004-62

INCL 429232000; 429231950; 429218100; 429212000; 427058000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **lithium sulfur rechargeable battery**

IT Fluoropolymers, uses

Polyoxyalkylenes, uses

Polyvinyl butyrals

RL: MOA (Modifier or additive use); USES (Uses)  
(binder; **lithium-sulfur batteries with good cycle life characteristics**)

IT Ceramics

(electrolyte; **lithium-sulfur**

**batteries with good cycle life characteristics**)

IT Glass, uses

RL: DEV (Device component use); USES (Uses)

(electrolyte; **lithium-sulfur**

**batteries with good cycle life characteristics**)

IT **Battery anodes**

**Battery cathodes**

**Battery electrolytes**

**Polymer electrolytes**

(**lithium-sulfur batteries with good cycle life characteristics**)

IT **Crown ethers**

**Sulfones**

RL: MOA (Modifier or additive use); USES (Uses)

(**lithium-sulfur batteries with good cycle life characteristics**)

IT **Secondary batteries**

(lithium; **lithium-sulfur batteries** with good cycle life characteristics)

IT Ligroine  
RL: DEV (Device component use); USES (Uses)  
(solvent; **lithium-sulfur batteries** with good cycle life characteristics)

IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(**lithium-sulfur batteries** with good cycle life characteristics)

IT 9002-84-0, Ptfе 9002-86-2, Polyvinyl chloride 9002-89-5, Polyvinyl alcohol 9003-19-4, Polyvinyl ether 9003-20-7, Polyvinyl acetate 9003-22-9, Vinyl acetate-vinyl chloride copolymer 9003-32-1, Polyethyl acrylate 9003-47-8, Polyvinylpyridine 9003-53-6, Polystyrene 9004-35-7, Cellulose acetate 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25086-89-9 25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; **lithium-sulfur batteries** with good cycle life characteristics)

IT 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses 33454-82-9, Lithium triflate  
RL: DEV (Device component use); USES (Uses)  
(**lithium-sulfur batteries** with good cycle life characteristics)

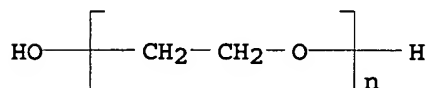
IT 115672-18-9P, Lithium sulfide (Li<sub>2</sub>(S<sub>8</sub>))  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(**lithium-sulfur batteries** with good cycle life characteristics)

IT 67-68-5, Dmsо, uses 67-71-0, Dimethyl sulfone 75-52-5, Nitromethane, uses 76-05-1, Trifluoroacetic acid, uses 96-48-0, Butyrolactone 107-21-1, Ethylene glycol, uses 109-99-9, Thf, uses 110-60-1, Tetramethylene diamine 110-71-4, Glyme 110-86-1, Pyridine, uses 110-95-2, Tetramethyl propylene diamine 111-96-6, Diglyme 126-33-0, Sulfolane 126-73-8, Tributyl phosphate, uses 127-19-5, n,n-Dimethyl acetamide 143-24-8, Tetraglyme 512-56-1, Trimethyl phosphate 617-84-5, n,n-Diethylformamide 632-22-4, Tetramethyl urea 646-06-0, Dioxolane 680-31-9, Hexamethylphosphoramide, uses 685-91-6, n,n-Diethyl acetamide 872-50-4, n-Methylpyrrolidone, uses 1330-20-7, Xylene, uses 1493-13-6, Trifluoromethanesulfonic acid 2832-49-7, n,n,n',n'-Tetraethyl sulfamide 7446-09-5, Sulfur dioxide, uses 7637-07-2, uses 9080-49-3, Polysulfide  
RL: MOA (Modifier or additive use); USES (Uses)  
(**lithium-sulfur batteries** with good cycle life characteristics)

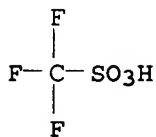
IT 78-51-3 84-66-2, Diethyl phthalate 84-74-2, Dibutyl phthalate 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 131-11-3, Dimethyl phthalate 2459-10-1, Trimethyl trimellitate  
RL: MOA (Modifier or additive use); USES (Uses)  
(plasticizer; **lithium-sulfur batteries** with good cycle life characteristics)

IT 60-29-7, Ether, uses 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 71-55-6, Trichloroethane 75-09-2, Dichloromethane, uses 79-01-6, Trichloroethylene, uses 110-54-3, Hexane, uses 110-82-7, Cyclohexane, uses  
RL: DEV (Device component use); USES (Uses)  
(solvent; **lithium-sulfur batteries** with

good cycle life characteristics)  
IT 25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; lithium-sulfur batteries with  
good cycle life characteristics)  
RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX  
NAME)

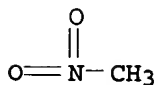


IT 33454-82-9, Lithium triflate  
RL: DEV (Device component use); USES (Uses)  
(lithium-sulfur batteries with good cycle  
life characteristics)  
RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 75-52-5, Nitromethane, uses 109-99-9, Thf,  
uses 110-71-4, Glyme 111-96-6, Diglyme  
126-33-0, Sulfolane 143-24-8, Tetraglyme  
646-06-0, Dioxolane  
RL: MOA (Modifier or additive use); USES (Uses)  
(lithium-sulfur batteries with good cycle  
life characteristics)  
RN 75-52-5 HCAPLUS  
CN Methane, nitro- (CA INDEX NAME)



*N-O*

RN 109-99-9 HCAPLUS  
CN Furan, tetrahydro- (CA INDEX NAME)

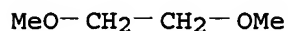


*solvent*

RN 110-71-4 HCAPLUS

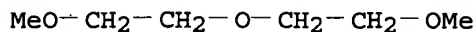


CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)

*solvent*

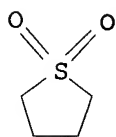
RN 111-96-6 HCAPLUS

CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)

*solvent*

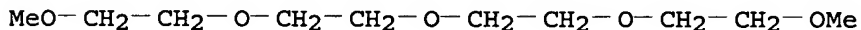
RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (CA INDEX NAME)

*solvent*

RN 143-24-8 HCAPLUS

CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)

*solvent*

RN 646-06-0 HCAPLUS

CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)

*solvent*

L83 ANSWER 12 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:658414 HCAPLUS

DN 137:188262

TI **Electrolytes with strong oxidizing additives for lithium /sulfur batteries**

IN Chu, May-Ying; Nimon, Yevgeniy S.; Visco, Steven J.

PA Polyplus Battery Company, USA

SO PCT Int. Appl., 54 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002067344	A2	20020829	WO 2002-US4274	20020213
	WO 2002067344	A3	20050203		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,

LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL,  
PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,  
US, UZ, VN, YU, ZA, ZW  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,  
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,  
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

US 6632573	B1	20031014	US 2001-789379	20010220
AU 2002306483	A1	20020904	AU 2002-306483	20020213
US 2004081894	A1	20040429	US 2003-645193	20030820
PRAI US 2001-789379	A	20010220		
WO 2002-US4274	W	20020213		

OS MARPAT 137:188262

AB Disclosed are oxidizer-treated lithium electrodes, **battery cells** containing such oxidizer-treated lithium electrodes, **battery cell electrolytes** containing oxidizing additives, and methods of treating lithium electrodes with oxidizing agents and **battery cells** containing such oxidizer-treated lithium electrodes. **Battery cells** containing SO<sub>2</sub> as an **electrolyte** additive in accordance with the present invention exhibit higher discharge capacities after **cell** storage over **cells** not containing SO<sub>2</sub>. Pre-treating the lithium electrode with SO<sub>2</sub> gas prior to **battery** assembly prevented **cell** polarization. Moreover, the SO<sub>2</sub> treatment does not neg. impact sulfur utilization and improves the **lithium's** electrochem. function as the neg. electrode in the **battery cell**.

IC ICM H01M

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **lithium sulfur battery electrolyte**  
oxidizing additive

IT Glass, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Li coated with; **electrolytes** with strong oxidizing additives for lithium/sulfur batteries)

IT **Battery electrolytes**  
Oxidizing agents  
(**electrolytes** with strong oxidizing additives for lithium/sulfur batteries)

IT Halogens  
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(**electrolytes** with strong oxidizing additives for lithium/sulfur batteries)

IT Alkali metal sulfides  
Polysulfides  
Sulfides, uses  
RL: DEV (Device component use); USES (Uses)  
(**electrolytes** with strong oxidizing additives for lithium/sulfur batteries)

IT Halides  
Halogen compounds  
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(halogen halides; **electrolytes** with strong oxidizing additives for lithium/sulfur batteries)

IT **Polyethers**, uses  
RL: DEV (Device component use); USES (Uses)  
(linear; **electrolytes** with strong oxidizing additives for lithium/sulfur batteries)

IT **Secondary batteries**

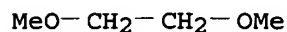
- (lithium; electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- IT Chlorides, uses  
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(oxychlorides; electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- IT Alkaline earth chalcogenides  
RL: DEV (Device component use); USES (Uses)  
(sulfides; electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- IT 124-38-9, Carbon dioxide, uses 646-06-0, Dioxolane 865-44-1, Iodine chloride icl3 872-36-6, Vinylene carbonate 7446-09-5, Sulfur dioxide, uses 7553-56-2, Iodine, uses 7719-09-7, Thionyl chloride 7726-95-6, Bromine, uses 7782-50-5, Chlorine, uses 7789-33-5, Iodine bromide ibr 7790-99-0, Iodine chloride (ICl) 7791-25-5, Sulfuryl chloride 10024-97-2, Nitrous oxide, uses 10025-67-9, Sulfur monochloride  
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- IT 67-68-5, Dms0, uses 68-12-2, Dmf, uses 110-60-1, Tetramethylenediamine 110-71-4, Monoglyme 110-86-1, Pyridine, uses 110-95-2, Tetramethylpropylenediamine 111-96-6, Diglyme 112-49-2, Triglyme 126-73-8, Tributyl phosphate, uses 127-19-5, n,n-Dimethylacetamide 143-24-8, Tetraglyme 512-56-1, Trimethyl phosphate 617-84-5, n,n-Diethylformamide 632-22-4, Tetramethylurea 680-31-9, Hexamethylphosphoramide, uses 685-91-6, n,n-Diethylacetamide 2832-49-7, n,n,n',n'-Tetraethylsulfamide 3030-47-5, Pentamethyldiethylenetriamine 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compound 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, organic compound 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 90076-65-6 115672-18-9, Lithium sulfide (Li2(S8)) 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- IT 646-06-0, Dioxolane  
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(electrolytes with strong oxidizing additives for lithium/sulfur batteries)
- RN 646-06-0 HCAPLUS
- CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)



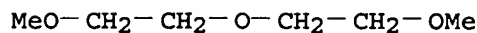
- IT 110-71-4, Monoglyme 111-96-6, Diglyme 112-49-2, Triglyme 143-24-8, Tetraglyme 33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
(electrolytes with strong oxidizing additives for  
lithium/sulfur batteries)

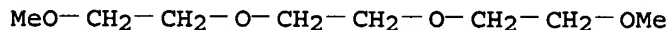
RN 110-71-4 HCAPLUS  
CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



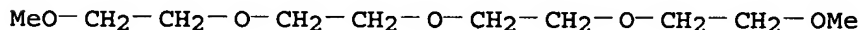
RN 111-96-6 HCAPLUS  
CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)



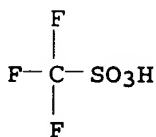
RN 112-49-2 HCAPLUS  
CN 2,5,8,11-Tetraoxadodecane (CA INDEX NAME)



RN 143-24-8 HCAPLUS  
CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)

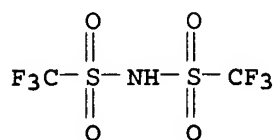


RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS  
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
lithium salt (9CI) (CA INDEX NAME)



● Li

L83 ANSWER 13 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:540172 HCAPLUS

DN 137:111688

TI Electrochemical cell having an electrode with a nitrite additive in the electrode active mixture

IN Gan, Hong; Takeuchi, Esther S.

PA USA

SO U.S. Pat. Appl. Publ., 8 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002094480	A1	20020718	US 2001-765266	20010118
	US 6528207	B2	20030304		
PRAI	US 2001-765266		20010118		

OS MARPAT 137:111688

AB Electrode-active materials for primary or secondary lithium **batteries** are fabricated in a method that includes mixing the active electrode material with a **nitrite** ester prior to contact of the active material with its current collector. The resulting electrode couple is activated by a non-aqueous **electrolyte** (especially containing Li salts) which dissolves the **nitrite** ester. The unsatd. **nitrite** ester has the general structure (RO)N(:O), in which R is C1-10-saturated hydrocarbonyl or heteroatom group, or C2-10-unsatd. hydrocarbonyl or heteroatom group. Suitable **nitrite** esters include Me **nitrite**, Et **nitrite**, Pr **nitrite**, iso-Pr **nitrite**, Bu **nitrite**, tert-Bu **nitrite**, iso-Bu **nitrite**, benzyl **nitrite**, and Ph **nitrite**. The **nitrite** ester is present in the anode and cathode active materials at a 0.05-5.0 weight% level.

IC ICM H01M004-62

ICS H01M004-54; H01M004-52; H01M004-58; H01M004-50; H01M004-40; H01M010-40

INCL 429212000; X42-921.9; X42-923.2; X42-923.15; X42-922.4; X42-922.3; X42-922.1; X42-922.0; X42-921.7; X42-934.1

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** electrode unsatd **nitrite** ester additive;  
cathode anode **battery** unsatd **nitrite** ester additive;  
**electrolyte** nonaq lithium **battery nitrite** ester additive

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)

(binder, **battery** electrodes containing; electrode-active materials for primary or secondary lithium **batteries** containing

- unsatd. **nitrite** ester additives)
- IT Carbon black, uses  
Chalcogenides  
Oxides (inorganic), uses  
Selenides  
Sulfides, uses  
Tellurides  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(conductive additive, **battery** electrodes containing; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT **Battery** anodes  
**Battery** cathodes  
**Battery** electrodes  
(electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT Lactams  
Lactones  
RL: DEV (Device component use); USES (Uses)  
(nonaq. **battery electrolytes** containing; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT **Battery electrolytes**  
(nonaq.; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT 7439-93-2, Lithium, uses 72785-69-4  
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(**battery** anode; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT 1307-96-6, Cobalt oxide, uses 1313-13-9, Manganese dioxide, uses 1313-99-1, Nickel oxide (NiO), uses 1317-38-0, Copper oxide, uses 11105-02-5, Silver vanadium oxide 11115-78-9, Copper sulfide 11126-12-8, Iron sulfide 12039-13-3, Titanium disulfide 12068-85-8, Iron disulfide 12789-09-2, Copper vanadium oxide 51311-17-2, Carbon fluoride 181183-66-4, Copper silver vanadium oxide  
RL: DEV (Device component use); USES (Uses)  
(**battery** cathode containing; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT 12026-36-7, Silver vanadium oxide (AgV2O5.5) 173478-95-0, Silver vanadium oxide (Ag0.35V2O5.18) 346712-58-1, Silver vanadium oxide (Ag0.8V2O5.4)  
RL: DEV (Device component use); USES (Uses)  
(**battery** cathodes containing; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)
- IT 7439-89-6D, Iron, chalcogenides 7439-96-5D, Manganese, chalcogenides 7439-98-7D, Molybdenum, chalcogenides 7440-02-0D, Nickel, chalcogenides 7440-03-1D, Niobium, chalcogenides 7440-32-6D, Titanium, chalcogenides 7440-44-0, Carbon, uses 7440-47-3D, Chromium, chalcogenides 7440-48-4D, Cobalt, chalcogenides 7440-50-8D, Copper, chalcogenides 7440-62-2D, Vanadium, chalcogenides 7782-42-5, Graphite, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(conductive additive, **battery** electrodes containing; electrode-active materials for primary or secondary lithium **batteries** containing unsatd. **nitrite** ester additives)

IT 109-95-5, Ethyl nitrite 540-80-7, tert-Butyl nitrite  
 541-42-4, Isopropyl nitrite 542-56-3, Isobutyl nitrite  
 543-67-9, Propyl nitrite 544-16-1, Butyl nitrite  
 624-91-9, Methyl nitrite 935-05-7, Benzyl nitrite  
 7782-77-6D, Nitrous acid, esters 34207-39-1, Nitrous  
 acid, phenyl ester  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (nonaq. battery electrolyte containing;  
 electrode-active materials for primary or secondary lithium  
 batteries containing unsatd. nitrite ester additives)

IT 67-68-5, Dimethyl sulfoxide, uses 68-12-2, Dimethyl formamide, uses  
 75-05-8, Acetonitrile, uses 79-20-9, Methyl acetate 96-48-0,  
 γ-Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
 carbonate 108-20-3, Diisopropyl ether 108-29-2,  
 γ-Valerolactone 108-32-7, Propylene carbonate 109-99-9,  
 Tetrahydrofuran, uses 110-71-4, 1,2-Dimethoxyethane  
 111-96-6, Diglyme 112-49-2, Triglyme 127-19-5,  
 Dimethyl acetamide 143-24-8, Tetraglyme 463-79-6D, Carbonic  
 acid, dialkyl esters 556-65-0, Lithium thiocyanate 616-38-6,  
 Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 623-96-1, Dipropyl  
 carbonate 629-14-1, 1,2-Diethoxyethane 872-50-4, N-Methylpyrrolidone,  
 uses 2923-17-3, Lithium trifluoroacetate 2923-20-8, Ethanesulfonic  
 acid, pentafluoro-, lithium salt 4437-85-8, Butylene carbonate  
 5137-45-1, 1-Ethoxy-2-methoxyethane 7790-69-4, Lithium  
 nitrate 7791-03-9; Lithium perchlorate 13453-75-3, Lithium  
 fluorosulfonate 14024-11-4, Lithium tetrachloroaluminate 14283-07-9,  
 Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenylborate  
 15955-98-3, Lithium tetrachlorogallate 18424-17-4, Lithium  
 hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate  
 29935-35-1, Lithium hexafluoroarsenate 30215-10-2, Lithium  
 benzenesulfonate 33454-82-9, Lithium trifluoromethanesulfonate  
 35363-40-7, Ethyl propyl carbonate, uses 56525-42-9, Methyl propyl  
 carbonate, uses 90076-65-6, Methanesulfonamide,  
 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt  
 132404-42-3, Methane, tris[(trifluoromethyl)sulfonyl]-, ion(1-), lithium  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. battery electrolytes containing;  
 electrode-active materials for primary or secondary lithium  
 batteries containing unsatd. nitrite ester additives)

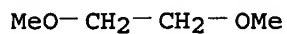
IT 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-32-6, Titanium,  
 uses 12597-68-1, Stainless steel, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (powder, conductive additive, battery electrodes containing;  
 electrode-active materials for primary or secondary lithium  
 batteries containing unsatd. nitrite ester additives)

IT 109-99-9, Tetrahydrofuran, uses 110-71-4,  
 1,2-Dimethoxyethane 111-96-6, Diglyme 112-49-2,  
 Triglyme 143-24-8, Tetraglyme 556-65-0, Lithium  
 thiocyanate 7790-69-4, Lithium nitrate  
 33454-82-9, Lithium trifluoromethanesulfonate 90076-65-6  
 , Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. battery electrolytes containing;  
 electrode-active materials for primary or secondary lithium  
 batteries containing unsatd. nitrite ester additives)

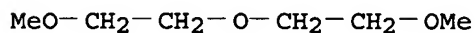
RN 109-99-9 HCAPLUS  
 CN Furan, tetrahydro- (CA INDEX NAME)

*solvent*

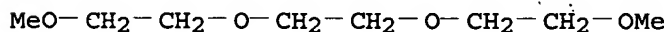
RN 110-71-4 HCAPLUS  
CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)

*solvent*

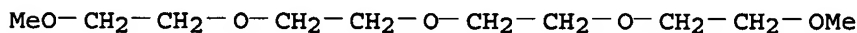
RN 111-96-6 HCAPLUS  
CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)

*solvent*

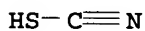
RN 112-49-2 HCAPLUS  
CN 2,5,8,11-Tetraoxadodecane (CA INDEX NAME)

*solvent*

RN 143-24-8 HCAPLUS  
CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)

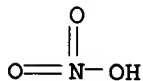
*solvent*

RN 556-65-0 HCAPLUS  
CN Thiocyanic acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 7790-69-4 HCAPLUS  
CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

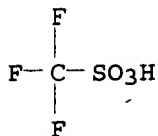
*N-O*

● Li

RN 33454-82-9 HCAPLUS



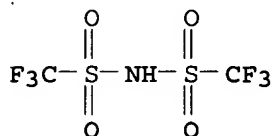
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

L83 ANSWER 14 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:143080 HCAPLUS

DN 136:186681

TI Layered arrangements of lithium anodes for lithium-sulfur batteries

IN Chu, May-Ying; Visco, Steven J.; Dejonghe, Lutgard C.

PA Polyplus Battery Company, USA

SO PCT Int. Appl., 51 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002015301	A2	20020221	WO 2001-US24342	20010802
	WO 2002015301	A3	20020926		
	WO 2002015301	A9	20030403		
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
	US 6413285	B1	20020702	US 2000-640467	20000816
	AU 2001081022	A5	20020225	AU 2001-81022	20010802

PRAI US 2000-640467 A 20000816  
US 1999-431190 A2 19991101  
WO 2001-US24342 W 20010802

AB A method employing a bonding layer is used to form active metal electrodes having barrier layers. Active metals such as lithium are highly reactive in ambient conditions. The method involves fabricating a lithium electrode or other active metal electrode without depositing the barrier layer on a layer of metal. Rather a smooth barrier layer is formed on a smooth substrate such as a web carrier or polymeric **electrolyte**. A bonding or alloying layer is formed on top of the barrier layer. Lithium or other active material is then attached to the bonding layer to form the active metal electrode. A current collector may also be attached to the lithium or active metal during the process.

IC ICM H01M004-00

CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)

ST **lithium sulfur battery anode layered arrangement**

IT Vapor deposition process  
(chemical; layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Battery anodes**  
(layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Polyethers**, uses  
Polymer blends  
Polyoxyalkylenes, uses  
Polyphosphazenes  
**Polythioethers**

RL: DEV (Device component use); USES (Uses)  
(layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Polyesters**, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Sulfide glasses**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(lithium borosulfide, releasable web carrier layer; layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Sulfide glasses**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(lithium silicon sulfide, releasable web carrier layer; layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Primary batteries**  
(lithium; layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT Vapor deposition process  
(phys.; layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Imines**  
RL: DEV (Device component use); USES (Uses)  
(polyimines; layered arrangements of lithium anodes for **lithium-sulfur batteries**)

IT **Glass**, uses  
**Polymers**, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(releasable web carrier layer; layered arrangements of lithium anodes

for lithium-sulfur batteries)

IT Aluminum alloy, base  
Titanium alloy, base  
RL: TEM (Technical or engineered material use); USES (Uses)  
(foil bonding layer; layered arrangements of lithium anodes for lithium-sulfur batteries)

IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(layered arrangements of lithium anodes for lithium-sulfur batteries)

IT 7439-96-5, Manganese, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-36-0, Antimony, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(foil bonding layer; layered arrangements of lithium anodes for lithium-sulfur batteries)

IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(layered arrangements of lithium anodes for lithium-sulfur batteries)

IT 12798-95-7  
RL: DEV (Device component use); FMU (Formation, unclassified); FORM (Formation, nonpreparative); USES (Uses)  
(layered arrangements of lithium anodes for lithium-sulfur batteries)

IT 25038-59-9, Polyethylene terephthalate, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(layered arrangements of lithium anodes for lithium-sulfur batteries)

IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7440-31-5, Tin, uses 7440-50-8, Copper, uses 7440-66-6, Zinc, uses 10377-52-3, Lithium phosphate 12627-14-4, Lithium silicate 12676-27-6 37220-89-6, Lithium aluminate 184905-46-2, Lithium nitrogen phosphorus oxide 236388-75-3, Aluminum lithium sulfide 236388-76-4, Lithium phosphide sulfide  
RL: TEM (Technical or engineered material use); USES (Uses)  
(releasable web carrier layer; layered arrangements of lithium anodes for lithium-sulfur batteries)

L83 ANSWER 15 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:90544 HCAPLUS

DN 136:137424

TI Fabrication of lithium anodes and batteries

IN Skotheim, Terje A.; Sheehan, Christopher J.; Mikhaylik, Yuriy V.; Affinito, John

PA USA

SO U.S. Pat. Appl. Publ., 22 pp., Cont.-in-part of U.S. Ser. No. 721,578.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002012846	A1	20020131	US 2001-864890	20010523
	US 6733924	B1	20040511	US 2000-721519	20001121
	US 6797428	B1	20040928	US 2000-721578	20001121
	CN 1728418	A	20060201	CN 2005-10079023	20001121
	WO 2002095849	A2	20021128	WO 2002-US16649	20020523
	WO 2002095849	A3	20031204		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,

GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

AU 2002312067 A1 20021203 AU 2002-312067 20020523  
 EP 1407505 A2 20040414 EP 2002-739419 20020523  
 EP 1407505 B1 20050803

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

CN 1511351 A 20040707 CN 2002-810473 20020523  
 JP 2004527888 T 20040909 JP 2002-592213 20020523  
 US 2005008935 A1 20050113 US 2004-913839 20040806  
 US 6936381 B2 20050830  
 US 2006222954 A1 20061005 US 2006-452445 20060613

PRAI US 1999-167171P P 19991123  
 US 2000-721519 A2 20001121  
 US 2000-721578 A2 20001121  
 CN 2000-818169 A3 20001121  
 US 2001-864890 A 20010523  
 WO 2002-US16649 W 20020523

AB Provided is an anode for use in electrochem. cells, wherein the anode active layer has a first layer comprising lithium metal and a multi-layer structure comprising single ion conducting layers and polymer layers in contact with the first layer comprising lithium metal or in contact with an intermediate protective layer, such as a temporary protective metal layer, on the surface of the lithium-containing first layer. Another aspect of the invention provides an anode active layer formed by the in-situ deposition of lithium vapor and a reactive gas. The anodes of the current invention are particularly useful in electrochem. cells comprising sulfur-containing cathode active materials, such as elemental sulfur.

IC ICM H01M004-40  
 ICS H01M004-66; B05D005-12

INCL 429231950

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery anode lithium; sulfur contg  
 cathode battery lithium anode

IT Polyesters, uses  
 RL: DEV (Device component use); USES (Uses)  
 (acrylates; fabrication of lithium anodes and batteries)

IT Battery anodes  
 (fabrication of lithium anodes and batteries)

IT Acrylic polymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

IT Polyoxyalkylenes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

IT Hydrocarbons, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

IT Borate glasses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium borate; fabrication of lithium anodes and batteries)

IT Phosphate glasses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium phosphate; fabrication of lithium anodes and batteries)

IT Sulfide glasses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium phosphosulfide; fabrication of lithium anodes and batteries)

IT Silicate glasses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium silicate; fabrication of lithium anodes and batteries)

IT Secondary batteries  
 (lithium; fabrication of lithium anodes and batteries)

IT 7631-86-9, Fumed silica, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (colloidal; fabrication of lithium anodes and batteries)

IT 110-71-4 646-06-0, 1,3-Dioxolane 1344-28-1, Dispal 11N7-12, uses 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses 12031-63-9, Lithium niobium oxide (LiNbO3) 12769-51-6, Lithium tantalum oxide 37220-89-6, Lithium aluminate 39302-37-9, Lithium titanium oxide 90076-65-6, Lithium bis(trifluoromethylsulfonyl)imide 152747-89-2, Lanthanum lithium oxide 184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum lithium sulfide 342379-43-5, Germanium lithium sulfide  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

IT 9002-89-5, Airvol 125 25322-68-3, Peo 64401-02-1, CD 9038 221629-51-2, CN 984  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

IT 74-85-1, Ethylene, uses 74-86-2, Acetylene, uses 124-38-9, Carbon dioxide, uses 7440-50-8, Copper, uses 7446-09-5, Sulfur dioxide, uses 7727-37-9, Nitrogen, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

IT 110-71-4 646-06-0, 1,3-Dioxolane  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of lithium anodes and batteries)

RN 110-71-4 HCAPLUS  
 CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)

MeO-CH<sub>2</sub>-CH<sub>2</sub>-OMe

RN 646-06-0 HCAPLUS  
 CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)

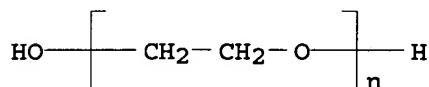


IT 25322-68-3, Peo

RL: MOA (Modifier or additive use); USES (Uses)  
(fabrication of lithium anodes and batteries)

RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX NAME)



L83 ANSWER 16 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:84080 HCAPLUS

DN 136:137402

TI **Electrolyte for a lithium-sulfur battery**

IN Hwang, Duckchul; Choi, Yunsuk; Choi, Sooseok; Lee, Jeawoan; Jung, Yongju; Kim, Joosoak

PA Samsung SDI Co. Ltd., S. Korea

SO Eur. Pat. Appl., 11 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1176658	A2	20020130	EP 2001-117642	20010724
	EP 1176658	A3	20060531		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	KR 2002008703	A	20020131	KR 2000-42735	20000725
	KR 2002014196	A	20020225	KR 2000-47348	20000817
	JP 2002083633	A	20020322	JP 2001-213414	20010713
	US 2002045101	A1	20020418	US 2001-911083	20010724
	US 6852450	B2	20050208		
	CN 1335652	A	20020213	CN 2001-132525	20010725
PRAI	KR 2000-42735	A	20000725		
	KR 2000-47348	A	20000817		

AB **An electrolyte for a lithium-sulfur battery** includes a first component solvent with a sulfur solubility more than or equal to 20 mM, a second component solvent with a sulfur solubility less than 20 mM, a third component solvent with a high dielec. constant and a high viscosity, and an electrolyte salt. This battery shows excellent capacity and cycle life characteristics.

IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **electrolyte lithium sulfur battery**

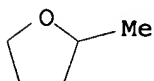
IT **Battery electrolytes**  
(electrolyte for lithium-sulfur battery)

IT **Secondary batteries**  
(lithium; electrolyte for lithium-sulfur battery)

IT **Synthetic polymeric fibers, uses**

RL: DEV (Device component use); USES (Uses)  
(polysulfides, carbon-polysulfur polymer; electrolyte for lithium-sulfur battery)

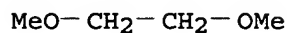
- IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(electrolyte for lithium-sulfur battery)
- IT 7440-44-0, Super P, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(activated; electrolyte for lithium-sulfur battery)
- IT 64-17-5, Ethanol, uses 67-63-0, Isopropanol, uses 71-43-2, Benzene, uses 79-20-9, Methyl acetate 96-47-9, 2-Methyltetrahydrofuran 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 108-88-3, Toluene, uses 108-94-1, Cyclohexanone, uses 109-60-4, Propyl acetate 109-99-9, Thf, uses 110-71-4 110-82-7, Cyclohexane, uses 111-96-6, Diglyme 126-33-0, Sulfolane 141-78-6, Ethyl acetate, uses 143-24-8, Tetraglyme 462-06-6, Fluorobenzene 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethylmethyl carbonate 646-06-0, 1,3-Dioxolane 1330-20-7, Xylene, uses 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, organic compound 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 27359-10-0, Trifluorotoluene 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 56525-42-9, Methylpropyl carbonate, uses 74432-42-1, Lithium polysulfide 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(electrolyte for lithium-sulfur battery)
- IT 124-38-9, Carbon dioxide, uses 7446-09-5, Sulfur dioxide, uses 9003-20-7, Polyvinyl acetate 10024-97-2, Nitrous oxide, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte for lithium-sulfur battery)
- IT 96-47-9, 2-Methyltetrahydrofuran 109-99-9, Thf, uses 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 143-24-8, Tetraglyme 646-06-0, 1,3-Dioxolane 33454-82-9, Lithium triflate 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(electrolyte for lithium-sulfur battery)
- RN 96-47-9 HCAPLUS  
CN Furan, tetrahydro-2-methyl- (CA INDEX NAME)



- RN 109-99-9 HCAPLUS  
CN Furan, tetrahydro- (CA INDEX NAME)

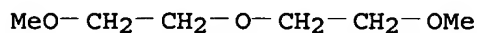


- RN 110-71-4 HCAPLUS  
CN Ethane, 1,2-dimethoxy- (CA INDEX NAME)



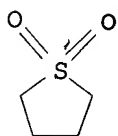
RN 111-96-6 HCAPLUS

CN Ethane, 1,1'-oxybis[2-methoxy- (9CI) (CA INDEX NAME)



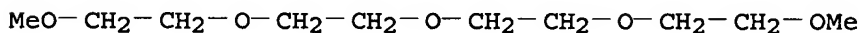
RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (CA INDEX NAME)



RN 143-24-8 HCAPLUS

CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)



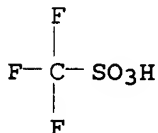
RN 646-06-0 HCAPLUS

CN 1,3-Dioxolane (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

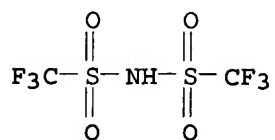


● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)





● Li

L83 ANSWER 17 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:141485 HCAPLUS

DN 132:168757

TI Liquid electrolyte lithium-sulfur batteries

IN Chu, May-Ying; De Jonghe, Lutgard C.; Visco, Steven J.; Katz, Bruce D.

PA Polyplus Battery Co., Inc., USA

SO U.S., 28 pp., Cont.-in-part of U.S. 5,686,201

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 15

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6030720✓	A	20000229	US 1997-948969	<u>19971010</u>
	US 5523179✓	A	19960604	US 1994-344384	19941123
	US 5582623	A	19961210	US 1995-479687	19950607
	US 5686201✓	A	19971111	US 1996-686609	19960726
	CA 2305454	A1	19990422	CA 1998-2305454	19981006
	WO 9919931	A1	19990422	WO 1998-US21067	19981006
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW				
	RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 9896876	A	19990503	AU 1998-96876	19981006
	AU 741815	B2	20011213		
	EP 1021849	A1	20000726	EP 1998-950967	19981006
	EP 1021849	B1	20030122		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	BR 9812749	A	20000829	BR 1998-12749	19981006
	JP 2001520447	T	20011030	JP 2000-516392	19981006
	AT 231653	T	20030215	AT 1998-950967	19981006
	US 6358643	B1	20020319	US 2000-495639	20000201
PRAI	US 1994-344384	A2	19941123		
	US 1995-479687	A2	19950607		
	US 1996-686609	A2	19960726		
	US 1997-948969	A	19971010		
	WO 1998-US21067	W	19981006		

OS MARPAT 132:168757

AB Disclosed are electrolyte solvents for ambient-temperature lithium-sulfur batteries. The disclosed solvents include at least one ethoxy repeating unit compound of the general

formula  $R_1(CH_2CH_2O)_nR_2$ , where  $n$  ranges between 2 and 10 and  $R_1$  and  $R_2$  are different or identical alkyl or alkoxy groups (including substituted alkyl or alkoxy groups). Alternatively,  $R_1$  and  $R_2$  may together with  $(CH_2CH_2O)_n$  form a closed ring. Examples of linear solvents include the glymes  $(CH_3O(CH_2CH_2)_nCH_3)$ . Some electrolyte solvents include a donor or acceptor solvent in addition to an ethoxy compound as described. Examples of donor solvents include hexamethylphosphoramide, pyridine,  $N,N$ -diethylacetamide,  $N,N$ -diethylformamide, dimethylsulfoxide, tetramethylurea,  $N,N$ -dimethylacetamide,  $N,N$ -dimethylformamide, tributylphosphate, trimethylphosphate,  $N,N,N',N'$ -tetraethylsulfamide, tetramethylenediamine, tetramethylpropylenediamine, and pentamethyldiethylenetriamine. These assist in solvation of lithium ions. Examples of acceptor solvents include alcs., glycols, and polyglycols. These assist in solvation of the sulfide and polysulfide anions.

IC ICM H01M010-40

INCL 429105000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery lithium sulfur liq electrolyte

IT Battery electrolytes  
Conducting polymers  
(liquid electrolyte lithium-sulfur batteries)

IT Carbon black, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

IT Alcohols, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

IT Crown ethers  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

IT Cryptands  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

IT Glycols, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

IT Secondary batteries  
(lithium; liquid electrolyte lithium-sulfur batteries)

IT Intercalation compounds  
RL: DEV (Device component use); USES (Uses)  
(lithium; liquid electrolyte lithium-sulfur batteries)

IT 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compound, uses 7440-23-5, Sodium, uses 7704-34-9, Sulfur, uses 90076-65-6  
RL: DEV (Device component use); USES (Uses)

(liquid electrolyte lithium-sulfur  
batteries)

IT 25322-68-3, Polyethylene oxide

RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)

(liquid electrolyte lithium-sulfur  
batteries)

IT 67-56-1, Methanol, uses 67-68-5, Dimethylsulfoxide, uses 68-12-2,  
N,N-Dimethylformamide, uses 75-52-5, Nitromethane,  
uses 76-05-1, Trifluoroacetic acid, uses 107-21-1, Ethylene glycol,  
uses 110-60-1, Tetramethylenediamine 110-86-1, Pyridine, uses  
110-95-2, Tetramethylpropylenediamine 126-73-8, Tributylphosphate, uses  
127-19-5, N,N-Dimethylacetamide 143-24-8, Tetraglyme 294-93-9,  
12-Crown-4 512-56-1, Trimethylphosphate 617-84-5, N,N-Diethylformamide  
632-22-4, Tetramethylurea 680-31-9, Hexamethylphosphoramide, uses  
685-91-6, N,N-Diethylacetamide 1493-13-6, Trifluoromethanesulfonic acid  
2832-49-7, N,N,N',N'-Tetraethylsulfamide 3030-47-5,  
Pentamethyldiethylenetriamine 7446-09-5, Sulfur dioxide, uses  
7637-07-2, Boron trifluoride, uses 14187-32-7, Dibenzo 18-crown-6  
17455-13-9, 18-Crown-6 33100-27-5, 15-Crown-5  
RL: DEV (Device component use); TEM (Technical or engineered material  
use); USES (Uses)

(liquid electrolyte lithium-sulfur  
batteries)

IT 7440-44-0, Carbon, uses

RL: MOA (Modifier or additive use); USES (Uses)

(liquid electrolyte lithium-sulfur  
batteries)

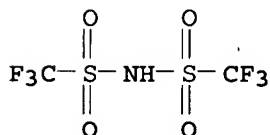
IT 90076-65-6

RL: DEV (Device component use); USES (Uses)

(liquid electrolyte lithium-sulfur  
batteries)

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
lithium salt (9CI) (CA INDEX NAME)



● Li

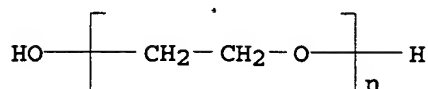
IT 25322-68-3, Polyethylene oxide

RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)

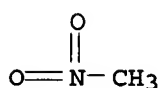
(liquid electrolyte lithium-sulfur  
batteries)

RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl), α-hydro-ω-hydroxy- (9CI) (CA INDEX  
NAME)

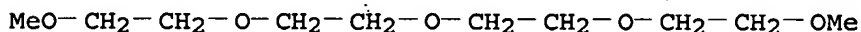


IT 75-52-5, Nitromethane, uses 143-24-8,  
Tetraglyme  
RL: DEV (Device component use); TEM (Technical or engineered material  
use); USES (Uses)  
(liquid electrolyte lithium-sulfur  
batteries)  
RN 75-52-5 HCAPLUS  
CN Methane, nitro- (CA INDEX NAME)



*N - O*

RN 143-24-8 HCAPLUS  
CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)



*solvent*

RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L83 ANSWER 18 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 1999:723300 HCAPLUS  
DN 131:312496  
TI Encapsulated lithium electrodes having glass protective layers and method  
for their preparation  
IN Visco, Steve J.; Tsang, Floris Y.  
PA Polypplus Battery Company, Inc., USA  
SO PCT Int. Appl., 33 pp.  
CODEN: PIXXD2  
DT Patent  
LA English  
FAN.CNT 15

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9957770	A1	19991111	WO 1999-US6895	19990329
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
US 6214061	B1	20010410	US 1998-139601	19980825
CA 2330293	A1	19991111	CA 1999-2330293	19990329
AU 9933713	A	19991123	AU 1999-33713	19990329
AU 745287	B2	20020321		
EP 1093672	A1	20010425	EP 1999-915119	19990329
EP 1093672	B1	20040825		

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, SI, LT, LV, FI, RO

BR 9910109	A	20011009	BR 1999-10109	19990329
JP 2002513991	T	20020514	JP 2000-547661	19990329
AT 274752	T	20040915	AT 1999-915119	19990329
US 6432584	B1	20020813	US 2000-678063	20001002

PRAI US 1998-83947P P 19980501  
US 1998-139601 A 19980825  
WO 1999-US6895 W 19990329

AB A method for fabricating an active metal electrode involves depositing lithium or other active metal electrode on a protective layer. The protective layer is a glassy or amorphous material that conducts ions of the active metal. It may be deposited on a releasable web carrier or other substrate such as polymer electrolyte layer. Lithium is then deposited on the protective layer. Finally, a current collector is attached to the lithium.

IC ICM H01M004-02  
ICS H01M004-04; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST lithium sulfur battery anode encapsulation

IT Secondary batteries  
(Li-S; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT Battery anodes  
Encapsulation  
Polymer electrolytes  
(encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT Polyethers, uses  
Polymers, uses  
Polyphosphazenes  
Polythioethers  
RL: DEV (Device component use); USES (Uses)  
(gel electrolyte containing; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(gel or solid electrolyte containing; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT Battery electrolytes  
(gel; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT Imines  
RL: DEV (Device component use); USES (Uses)  
(polyimines, gel electrolyte containing; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT 7440-02-0, Nickel, uses 12597-68-1, Stainless steel, uses  
RL: DEV (Device component use); USES (Uses)  
(current collector; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT 10377-52-3, Lithium phosphate 12627-14-4, Lithium silicate 12676-27-6  
37220-89-6, Lithium aluminate 184905-46-2, Lithium nitrogen phosphorus oxide 236388-73-1, Lithium silicide sulfide 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum Lithium sulfide

236388-76-4, Lithium phosphide sulfide

RL: DEV (Device component use); USES (Uses)

(protective layer containing; encapsulated lithium electrodes having glass protective layers and method for their preparation)

IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7440-31-5, Tin, uses 7440-50-8, Copper, uses 7440-66-6, Zinc, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(releasable web carrier; encapsulated lithium electrodes having glass protective layers and method for their preparation)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L83 ANSWER 19 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1999:271600 HCAPLUS

DN 130:284490

TI Liquid electrolyte lithium-sulfur batteries

IN Chu, May-Ying; De Jonghe, Lutgard C.; Visco, Steven J.; Katz, Bruce D.

PA Polyplus Battery Company, Inc., USA

SO PCT Int. Appl., 57 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 15

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9919931	A1	19990422	WO 1998-US21067	19981006
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW				
RW: GH, GM, KE, LS, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
US 6030720	A	20000229	US 1997-948969	<del>19971010</del>
CA 2305454	A1	19990422	CA 1998-2305454	19981006
AU 9896876	A	19990503	AU 1998-96876	19981006
AU 741815	B2	20011213		
EP 1021849	A1	20000726	EP 1998-950967	19981006
EP 1021849	B1	20030122		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
BR 9812749	A	20000829	BR 1998-12749	19981006
JP 2001520447	T	20011030	JP 2000-516392	19981006
AT 231653	T	20030215	AT 1998-950967	19981006
PRAI US 1997-948969	A	19971010		
US 1994-344384	A2	19941123		
US 1995-479687	A2	19950607		
US 1996-686609	A2	19960726		
WO 1998-US21067	W	19981006		
OS MARPAT 130:284490				
AB	Disclosed are electrolyte solvents for ambient-temperature lithium-sulfur batteries. The disclosed solvents include at least one ethoxy repeating unit compound of the general formula $R_1(CH_2CH_2O)_nR_2$ , where n ranges between 2 and 10 and $R_1$ and $R_2$ are different or identical alkyl or alkoxy groups (including substituted alkyl or alkoxy groups). Alternatively, $R_1$ and $R_2$ may together with $(CH_2CH_2O)_n$ form a closed ring. Examples of linear solvents include the glymes $(CH_3O(CH_2CH_2)_nCH_3)$ . Some electrolyte solvents include a			

donor or acceptor solvent in addition to an ethoxy compound as described. Examples of donor solvents include hexamethylphosphoramide, pyridine, N,N-diethylacetamide, N,N-diethylformamide, dimethylsulfoxide, tetramethylurea, N,N-dimethylacetamide, N,N-dimethylformamide, tributylphosphate, trimethylphosphate, N,N,N',N'-tetraethylsulfamide, tetramethylenediamine, tetramethylpropylenediamine, and pentamethyldiethylenetriamine. These assist in solvation of lithium ions. Examples of acceptor solvents include alcs., glycols, and polyglycols. These assist in solvation of the sulfide and polysulfide anions.

- IC ICM H01M010-40  
 CC 52-2 (**Electrochemical**, Radiational, and Thermal Energy Technology)  
 ST **electrolyte solvent lithium sulfur battery**  
 IT **Battery cathodes**  
     **Battery electrolytes**  
     **Secondary batteries**  
         (liquid **electrolyte lithium-sulfur batteries**)  
 IT Alcohols, uses  
     Carbon black, uses  
     Carbon fibers, uses  
     Glycols, uses  
     Polyoxyalkylenes, uses  
     Polysulfides  
     Sulfides, uses  
     RL: DEV (Device component use); USES (Uses)  
         (liquid **electrolyte lithium-sulfur batteries**)  
 IT **Crown ethers**  
     RL: MOA (Modifier or additive use); USES (Uses)  
         (liquid **electrolyte lithium-sulfur batteries**)  
 IT **Cryptands**  
     RL: MOA (Modifier or additive use); USES (Uses)  
         (liquid **electrolyte lithium-sulfur batteries**)  
 IT **143-24-8, Tetraethyleneglycol dimethyl ether**  
     7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compound, uses  
     7440-23-5, Sodium, uses 7440-44-0, Carbon, uses 7704-34-9, Sulfur, uses  
     7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate  
     21324-40-3, Lithium hexafluorophosphate 25322-68-3, Peo 29935-35-1,  
     Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 74432-42-1,  
     Lithium polysulfide 90076-65-6  
     RL: DEV (Device component use); USES (Uses)  
         (liquid **electrolyte lithium-sulfur batteries**)  
 IT 67-56-1, Methanol, uses 67-68-5, Dimethylsulfoxide, uses 68-12-2,  
     N,N-Dimethylformamide, uses 75-52-5, **Nitromethane**, uses 76-05-1,  
     Trifluoroacetic acid, uses 107-21-1, Ethylene glycol, uses 110-60-1,  
     Tetramethylenediamine 110-86-1, Pyridine, uses 110-95-2, Tetramethylpropylenediamine  
     126-73-8, Tributylphosphate, uses 127-19-5, N,N-Dimethylacetamide  
     512-56-1, Trimethylphosphate 617-84-5, N,N-Diethylformamide 632-22-4,  
     Tetramethylurea 680-31-9, Hexamethylphosphoramide, uses 685-91-6,  
     N,N-Diethylacetamide 1493-13-6, Trifluoromethanesulfonic acid 1822-45-3,  
     Tetramethylpropylenediamine 2832-49-7, N,N,N',N'-Tetraethylsulfamide  
     3030-47-5, Pentamethyldiethylenetriamine. 7446-09-5, Sulfur dioxide,  
     uses 7637-07-2, Boron trifluoride, uses

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

IT 294-93-9, 12-Crown-4 14187-32-7, Dibenzo-18-crown-6 17455-13-9, 18-Crown-6 33100-27-5, 15-Crown-5

RL: MOA (Modifier or additive use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

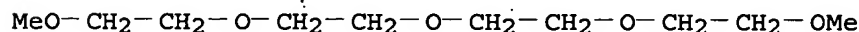
IT 143-24-8, Tetraethyleneglycol dimethyl ether 25322-68-3, Peo 33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)

(liquid electrolyte lithium-sulfur batteries)

RN 143-24-8 HCAPLUS

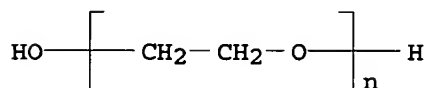
CN 2,5,8,11,14-Pentaoxapentadecane (CA INDEX NAME)



*solvent*

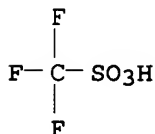
RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX NAME)



RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

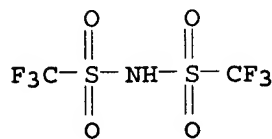


● Li

RN 90076-65-6 HCAPLUS

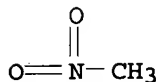
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)





● Li

IT 75-52-5, Nitromethane, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (liquid electrolyte lithium-sulfur batteries)  
 RN 75-52-5 HCAPLUS  
 CN Methane, nitro- (CA INDEX NAME)



N-O

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L83 ANSWER 20 OF 20 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 1997:411030 HCAPLUS  
 DN 127:97541  
 TI Calcined coke containing **nitrogen** and **sulfur** for  
**cathodes** of electrochemical cells having **lithium**  
**anode**  
 IN Lewis, Irwin Charles; Greinke, Ronald Alfred  
 PA Ucar Carbon Technology Corporation, USA  
 SO U.S., 12 pp.  
 CODEN: USXXAM  
 DT Patent  
 LA English  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5639576	A	19970617	US 1996-654661	19960529
	DE 19703954	A1	19971204	DE 1997-19703954	19970203
	DE 19703954	C2	20000525		
	JP 09320571	A	19971212	JP 1997-22949	19970205
PRAI	US 1996-654661	A	19960529		

AB The cathodes suitable for electrochem. cells with an alkali metal (especially Li) **anode** are manufactured from: (a) calcined coke powder containing  $\geq 0.5$  N and  $\geq 1.0$  weight% S heteroatoms, and having average particle size of 2-40  $\mu\text{m}$  with the maximum size  $\leq 50$   $\mu\text{m}$ ; (b) the binder typically selected from poly(vinylidene fluoride) or ethylene-propylene-diene terpolymer; and (c) optional elec. conductive C. The calcined coke cathodes typically contain 1-2 N and 1-3 weight% S from the starting pitch and other raw materials. The bonded coke electrodes are also suitable as the anodes used with: (a)  $\text{MoS}_2$ ,  $\text{CoO}_2$ , or similar bonded cathodes; and (b) electrolyte with organic aprotic solvent or a polymer, as well as  $\text{LiAsF}_6$  or a similar elec. conductive Li salt. The bonded-coke

electrodes contain reversibly intercalated Li at the capacity  $\leq 70\%$  of nominal LiC6 limit, vs. 20% when the coke contains only 0.21 N and 0.57 weight% S.

IC ICM H01M004-38

INCL 429218000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 51

ST electrochem cell lithium doped coke electrode; coke cathode electrochem cell **lithium anode**; sulfide cathode cell bonded coke anode

IT EPDM rubber

Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)

(binder with; calcined coke powder for bonded electrodes of electrochem. cells)

IT Cathodes

(coke-based; calcined coke containing **nitrogen** and sulfur for bonded electrodes of electrochem. cells)

IT Electrodes

(coke; calcined coke containing **nitrogen** and sulfur for electrodes of electrochem. cells)

IT Coke

RL: DEV (Device component use); USES (Uses)

(doped; calcined coke containing **nitrogen** and sulfur for electrodes of electrochem. cells)

IT Polyoxyalkylenes, uses

RL: MOA (Modifier or additive use); USES (Uses)

(electrochem. cells with; bonded electrodes for electrochem. cells with organic aprotic solvent and lithium salt)

IT **Anodes**

(**lithium**; calcined coke containing **nitrogen** and sulfur for electrodes of electrochem. cells with **lithium anodes**)

IT 24937-79-9, Polyvinylidene fluoride

RL: DEV (Device component use); USES (Uses)

(binder with; calcined coke powder for bonded electrodes of electrochem. cells)

IT 7704-34-9, Sulfur, uses 7727-37-9, **Nitrogen**, uses

RL: MOA (Modifier or additive use); USES (Uses)

(coke doped with; calcined coke containing **nitrogen** and sulfur for electrodes of electrochem. cells)

IT 12057-17-9, Lithium manganate (LiMn2O4) 12190-79-3, Cobalt lithium oxide (LiCoO2) 25014-41-9, Polyacrylonitrile 25322-68-3,

Polyethylene oxide 29935-35-1, Lithium hexafluoroarsenate

RL: MOA (Modifier or additive use); USES (Uses)

(electrochem. cells with; bonded electrodes for electrochem. cells with organic aprotic solvent and lithium salt)

IT 1313-13-9, Manganese dioxide, uses 1317-33-5, Molybdenum sulfide (MoS2), uses 7782-42-5, Graphite, uses 12017-00-4, Cobalt oxide (CoO2)

12037-42-2, Vanadium oxide (V6O13)

RL: DEV (Device component use); USES (Uses)

(electrodes with; bonded electrodes for electrochem. cells with organic aprotic solvent and lithium salt)

IT 7439-93-2, Lithium, uses

RL: MOA (Modifier or additive use); USES (Uses)

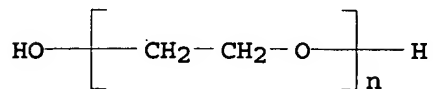
(intercalated; calcined coke containing intercalated lithium for electrodes of electrochem. cells)

IT 25322-68-3, Polyethylene oxide

RL: MOA (Modifier or additive use); USES (Uses)

(electrochem. cells with; bonded electrodes for electrochem. cells with

organic aprotic solvent and lithium salt)  
RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI) (CA INDEX  
NAME)



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